DOCUMENT RESUME

ED 216 111 CE 032 064

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TITLE Aviation Mechanics. Post Secondary Curriculum Guide.
INSTITUTION Georgia Univ., Athens. Div. of Vocational Education.
SPONS AGENCY Georgia State Dept. of Education, Atlanta. Office of Adult and Vocational Education.
PUB DATE 81
NOTE 526p.

EDRS PRICE MF02/PC22 Plus Postage.
DESCRIPTORS *Aviation Mechanics; Behavioral Objectives; Competence; Course Descriptions; Definitions; *Educational Facilities; Educational Objectives; Educational Philosophy; Employment Potential; Group Instruction; Individualized Instruction; *Instructional Development; Instructional Materials; *Job Skills; Learning Activities; Mechanical Skills; Models; Postsecondary Education; Records (Forms); Resources; Skilled Occupations; State Curriculum Guides; Student Evaluation; *Technical Education; Vocational Education
IDENTIFIERS Georgia; Special Needs Students

ABSTRACT

Intended to provide a model for organizing vocational instructional content, this curriculum guide consists of information pertinent to conducting a postsecondary level course in aviation mechanics. While the guide is primarily oriented towards the classroom, whether as a primary resource or as a supplement to other teaching materials, it may also assist administrators, counselors, and lay people involved in local school systems. Following an introductory discussion of state and local philosophy and objectives underlying vocational education, occupational information is provided concerning aviation mechanics. Presented next are a series of unit guides, each of which contains a task statement, a performance objective, instructional activities, suggested instructional materials, and evaluation criteria. The next two sections consist of a sample curriculum structure and course outline and various student records. Described next are group and individualized instructional facilities. The three appendixes contain a list of instructional resources and resource addresses, material for use in working with special needs students, and definitions. (MN)

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AVIATION MECHANICS

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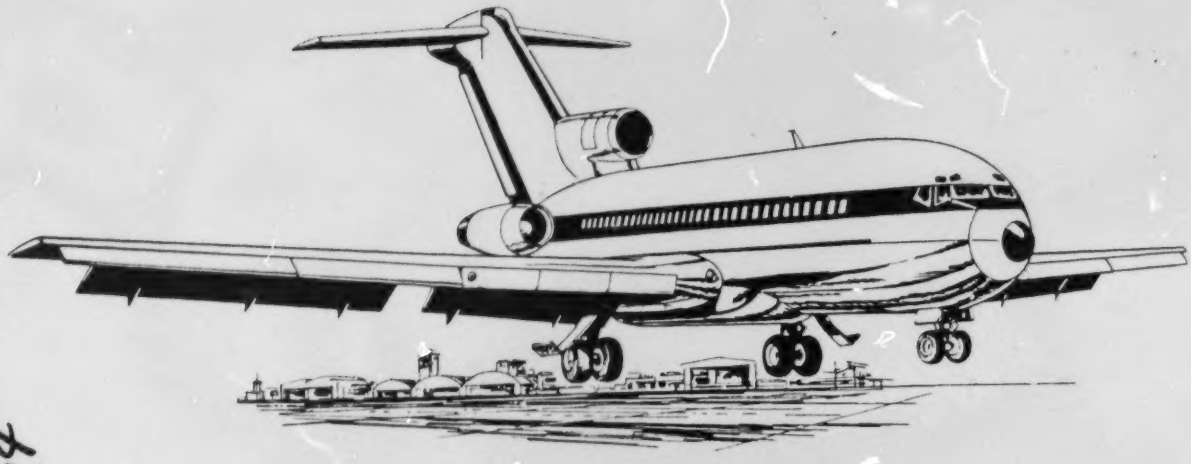

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CURRICULUM GUIDE

Georgia Department of Education

AVIATION MECHANICS

Developed Under Contractual Agreement with

Division of Program Development
Office of Vocational Education
Georgia Department of Education
Atlanta, Georgia 30334
Charles McDaniel, State Superintendent of Schools
1981

AVIATION MECHANICS

Developed By

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POLICIES AND PROCEDURES FOR THE CENTER

PURPOSE OF THE CENTER

The Vocational Education Materials Center functions within the division of Vocational Education, University of Georgia. This Center operates under grants from the U.S. Office of Education, and the Georgia State Department of Education with the support of the College of Education. The Center is comprehensive in its commitment and approach to the development and dissemination of materials in the broad field of Vocational Education.

The purpose of the Center is to increase the capability of Georgia's delivery system for Vocational Education. Specifically, the Center is committed to:

1. Develop materials to assist in the implementation of proposed curricula and to enhance the teaching Vocational Education.

2. Conduct and report curriculum research related to Vocational Education.

3. Provide a production and dissemination center to Vocational Education materials.

4. Provide direct experiences in curriculum development and diffusion for advanced graduate stduents.

5. Enable faculty members to participate in the development and implementation of a variety of curriculum materials.

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PURPOSE AND UTILIZATION OF THE CURRICULUM GUIDES

The purpose of this curriculum guide is to provide a suggested model for organizing vocational instructional content. In many cases, more material is available than may be needed, there fore, an instructor will need to adapt the content to meet his/her program needs.

While the guide is primarily oriented towards the classroom, whether as a primary resource or as a supplement to other teaching materials; it may also assist administrators, counselors and lay people involved in local school systems. The following outline provides an overview of the various ways these groups may utilize the curriculum guides.

a) Vocational teachers.

1. Provide a guide for organizing their program of instruction,
2. Assist in establishing program objectives,
3. Serve as a curriculum materials resource guide,
4. Improve communications with employers and advisory committees
5. Facilitate competency based instruction,
6. Facilitate either group or self-paced instruction,
7. Include content by quarter and semester,
8. Cross-reference with existing state developed instructional materials (PLACE packages and post secondary I.I.).

b) Vocational supervisors and administrators.

1. Assist in defining the scope and content of their programs,
2. Provide a means to improve curriculum management functions,
3. Serve as a guide for admissions and job placement functions,
4. Improve communications with employers and advisory committees.

c) Counseling and guidance staff.

1. Provide a data base for counseling and guidance personnel,
2. Identify student exit points (Career Options),
3. Serve as guide for admissions and job placement,

4. Correlate with new State Board of Education graduation requirements,
5. Provide specific content sequencing by quarter and semester for student scheduling,
6. Provide (a) curriculum options for the disadvantaged handicapped student, (b) curriculum modifications for SPECIAL NEEDS students, (c) typical admission requirements for regular and SPECIAL NEEDS students.

(d) Local Curriculum Coordination Committees.

1. Serve as a guide in working out articulation arrangements,
2. Improve definitions of the relationship between secondary clusters and post secondary specialized programs.

Vocational teachers, supervisors and administrators, counseling and guidance staff and local curriculum coordination committees will be primary users of this guide, however, the use of the guide is not limited to these groups, but by any and all groups directly related in designing a vocational curriculum.

SECTION I

PHILOSOPHY, PURPOSE & OBJECTIVES

SECTION I

Section I Content List

State Philosophy and Goals
Local Philosophy and Goals

Section I provides an overview of the philosophies, purposes and goals for vocational education in the State of Georgia. These are applied to vocational education at the secondary level, however, it is recognized that more specific philosophies, purposes and goals will be applicable depending on the character of the local program.

VOCATIONAL EDUCATION IN GEORGIA

A. PHILOSOPHY

The Georgia Board of Education perceives vocational education as a vital component in the education of the young and adult citizens of this State. Appropriate programs of vocational education and ancillary services should be made readily available to individuals in middle schools, vocational divisions of junior colleges, vocational centers, the Quick Start program and other adult programs designed to train or retrain workers for useful and satisfying employment.

Special services and assistance must be provided to those who need it in order to participate or benefit from vocational education. This includes women, minorities, the displaced homemaker and other displaced workers, those with limited English-speaking ability, the disadvantaged and the handicapped.

Since men and women spend the greater part of their lives at some form of work, the State should provide opportunities for all its citizens to develop the knowledge, skills and attitudes necessary for them to secure personally satisfying and socially useful employment.

B. PURPOSE

The purpose of vocational education shall be to improve the economic well-being of Georgia citizens by preparing individuals, through organized learning experiences, to select, obtain and advance in recognized occupations.

POSTSECONDARY VOCATIONAL EDUCATION

A. PURPOSE

The purpose of postsecondary vocational-technical education in Georgia is to improve the economic well-being of adult citizens by providing access to high quality vocational-technical training for skilled and semi-skilled occupations, for improvement of existing skills or for retraining in a new occupation.

B. OBJECTIVES

1. To provide vocational-technical education programs and ancillary services commensurate with the needs and interests of students and available job opportunities.

2. To provide vocational-technical education programs which are current with the state-of-the-art, competency-based, and offer multiple exit points to accommodate the students' occupational objectives.

3. To provide vocational-technical education programs which are articulated with available high school counterparts, to facilitate an easy transition from secondary to postsecondary levels without loss of credit.

4. To provide vocational-technical education programs such that 75% of those individuals who leave or complete a program of occupational preparation will find employment in the field, or a related field, for which trained.

5. To provide those guidance, counseling, financial aid, evaluative, job placement, remedial and other supportive programs and services needed by students to enroll, complete a program and become, or remain, employable in a skilled or semi-skilled occupation.

6. To provide needed assistance to special populations to include women, minorities, limited English-speaking, the displaced homemaker and other displaced workers, the disadvantaged and the handicapped.

7. To provide vocational-technical education programs for full-time and part-time students on campus during the day as well as the evening hours, and to provide appropriate programs for full-time and part-time students off campus in businesses and industries, comprehensive high schools and other locations within the respective schools' service areas.

8. To serve as a center for the delivery of postsecondary and adult vocational-technical education programs and services for the community and assigned service area.

STATEMENT OF LOCAL SYSTEM PHILOSOPHY, PURPOSE

AND OBJECTIVES FOR VOCATIONAL EDUCATION

(This page is intentionally left blank so that local systems may insert their copy of philosophy, purpose and goals for vocational education.)

SECTION II

PROGRAM DESCRIPTION & RELATED INFORMATION

SECTION II

Section II Content List

Employability Skills
Aviation Mechanics Occupational Description
Aviation Mechanics Program Objective
Definition of the D.O.T. Code
Description of Aviation Mechanics D.O.T.
Task Listing by D.O.T. Code
Compliance with FAR Part 147

The major goal of vocational educational in Georgia is to prepare individuals, through organized learning experiences, to select, obtain and advance in recognized occupations. Section II provides an overview of employability skills that are desirable in any occupation and relates their significance to the specific occupational area of Aviation Mechanics.

The Aviation Mechanics Program Objective contains the specific occupational titles. These occupational titles are further explained in the description of the occupational exit points and task listing. The concentration of the program is based on these tasks.

Finally, an explanation of FAR Part 147, Aviation Maintenance Technician Schools and how this guide can provide aid in meeting FAA requirements is included.

EMPLOYABILITY SKILLS

Employability skills exert a great deal of influence on a person's ability to get and keep a job. Surveys indicate that more people lose their jobs because of poor attitudes toward their job than for lack of job skills. For this reason it is important that information concerning the following employability skills be provided as an ongoing part of the program.

1. Getting a job
   a. Filling out job applications
   b. Developing a resume
   c. Preparing for a job interview

2. Keeping a job
   a. Be on time and regular in attendance
   b. Maintain a fair share of the work-load
   c. Work without supervision
   d. Meet production schedules
   e. Properly care for and use equipment
   f. Dress appropriately for the job
   g. Maintain good personal hygiene
   h. Develop and maintain good communication with supervisors and co-workers

A recent study sponsored by the Illinois Department of Adult, Vocational and Technical Education and conducted by the University of Illinois, "Survival Skills: Mastering the Human Aspects of Work", has identified twelve topics that might be developed into instructional modules for teaching occupational survival skills. The author, Robert E. Nelson, outlines these topics listed below and on the next page, each followed by a general objective which indicates the relationship between the topic and the survival skills required to maintain a job.

*"1. <u>Working in an Organization</u>: To familiarize students with the reasons for the formation of organizations and the common characteristics of organizations.

2. <u>Understanding Self and Others</u>: To have students develop insights into causes of human behavior and learn to interpret their own behavior and the behavior of other.

3. Motivation for Work: To have students develop and understanding of motivations into the work they perform.
4. Interpersonal Relations: To have students develop concepts and skills in interpersonal relations and apply them to work situations.
5. On-the-Job Communication: To have students understand the importance of effective communication and learn ways of communicating effectively on the job.
6. Using Creativity on the Job: To make students aware of their creative potential and to practice using their creative ability in hypothetical on-the-job situations.
7. Authority and Responsibility: To have students develop an understanding of the concepts of authority, power, influence, and responsibility as they apply to work situations.
8. Problem Solving: To have students develop skill in applying problem solving to their work.
9. Coping with Organizational Change: To make students aware of the process of organizational change and the techniques for coping with organizational change.
10. Coping with Organizational Conflict: To make students aware of the sources and types of conflicts encountered on the job and recognize ways of coping with conflicts in an organization.
11. Leadership: To have students recognize the need for leadership in work groups and increase their understanding of the leadership role in work situations.
12. Adapting and Planning for the Future: To have students develop perspectives of work in the future and the ability to plan for anticipated changes in their work roles."

*Abstracted from the article, "Survival Skills: Mastering the Human Aspects of Work," by Robert E. Nelson, American Vocational Journal, November 1977.

AVIATION MECHANICS*

Nature of the Work

Today most travelers hardly think twice about flying thousands of feet above the ground. The confidence travelers have in airplanes is a tribute to the mechanics who maintain them. To keep planes in top operating condition, airplane mechanics perform scheduled maintenance, make repairs, and complete inspections required by the Federal Aviation Administration (FAA).

Many mechanics specialize in scheduled maintenance. Following a schedule that is based on the number of hours flown, calendar days, or a combination of these factors, mechanics inspect the engines, landing gear, instruments, and other parts of the plane and perform necessary maintenance. For example, they may examine an engine through specially designed openings while working from ladders or scaffolds, or use hoists or lifts to remove the entire engine from the plane. Mechanics may take the engine apart to measure the parts for wear using sensitive instruments and check for invisible cracks with X-ray and magnetic inspection equipment. Worn or defective parts are replaced. They also may repair sheet-metal surfaces, measure the tension of control cables, or check for rust, distortion, and cracks in the fuselage and wings. Mechanics test the equipment to make sure the repairs were made properly.

Some mechanics specialize in repair work, using the pilot's description of a problem to find and fix faulty equipment. For example, during a preflight check, a pilot may discover that

the plane's gas gauge does not work. To solve the problem, mechanics may check the electrical connections, replace the gauge, or use electric test equipment to make sure no wires are broken or shorted. They work as fast as safety permits so that the plane can be put back into service quickly.

Mechanics may work on many types of airplanes, on one type of plane, or they may specialize in working on one section of the plane, such as engines or electrical systems. For efficiency's sake, airline mechanics usually specialize in one section of a particular type of plane. Mechanics employed by companies that own their own aircraft need only be familiar with the types of planes owned by the company. However, they must be able to repair all sections of these planes. At small, independent repair shops, mechanics usually make all kinds of inspections and repairs on many different types of aircraft.

Working Conditions

Mechanics usually work in hangars or in other indoor areas. However, if the hangars are full or if repairs must be made quickly, they may work outdoors. This occurs most often to airline mechanics who work at airports because, to save time, minor repairs and preflight checks often are performed at the terminal. Mechanics sometimes must stand or lie in awkward positions when making repairs and work areas are noisy when engines are being tested. Some mechanics employed by the airlines must work nights.

Places of Employment

About 107,000 airplane mechanics were employed in 1978, not including about 25,000 who worked in aircraft manufacturing

firms assembling airplanes. About one-half worked for airlines and about one-fourth worked for the Federal Government. The rest were general aviation mechanics, most of whom worked for independent repair shops or companies that operate their own planes to transport executives and cargo.

Most airline mechanics work near large cities at the airlines' main stops. Many employees of the Federal Government are civilians employed by the military and work at large military bases. Others work for the FAA, many in the headquarters at Oklahoma City. Mechanics for independent repair shops work at airports in every part of the country.

Training, Other Qualifications, and Advancement

The majority of mechanics who work on civilian aircraft are licensed by the FAA as "airframe mechanics," "powerplant mechanics," or "aircraft inspectors." Airframe mechanics are qualified to work on the fuselage, wings, landing gear, and other structural parts of the plane, while powerplant mechanics are qualified only for work on the engine. Combination airframe-and-powerplant mechanics can work on any part of the plane, and those with an inspector's license can certify inspection work completed by other mechanics. Unlicensed mechanics are supervised by those with licenses.

At least 18 months of work experience are required for an FAA airframe or powerplant license. For a combined license, at least 30 months of experience working with both engines and airframes are required. To obtain an inspector's license, a mechanic must have held an airframe-and-powerplant license for at least 3 years. Applicants for all licenses also must pass

written and oral tests and give practical demonstration of their ability to do the work authorized by the license. Although a few people become mechanics through on-the-job training, most learn their job in the Armed Forces or in trade schools certified by the FAA. Courses in these trade schools last from 18 months to 2 years and provide training with the tools and equipment mechanics will use on the job. Attendance at such schools may be used as a substitute for work experience when applying for an FAA license. However, these schools do not guarantee students jobs or FAA licenses.

Some aircraft mechanics in the Armed Forces acquired enough general experience to satisfy the work experience requirements for the FAA license. With additional study they may pass the licensing exam. Generally, however, their jobs in the military were too specialized to provide the broad experience required by the FAA. Most find it necessary to complete the entire training program at a trade school, although a few receive some credit for the material they learned in the service. Military experience is an asset when seeking employment, however; employers consider trade school graduates who have this experience to be the most desirable applicants.

A high school diploma or its equivalent is necessary for all prospective aircraft mechanics. Courses in mathematics, physics, chemistry, and mechanical drawing are helpful because knowledge of the principles involved in the operation of an aircraft often is necessary in order to learn how to make repairs.

Aircraft mechanics must be able to do detailed work and

have the strength to lift heavy parts and tools. Agility is important for the reaching and climbing that are necessary to the job. Aircraft mechanics must not be afraid of heights since they must work on the top of wings and fuselages on large jet planes.

As aircraft mechanics gain experience, they can advance to more responsible jobs. Opportunities are best for those who have an airframe-and-powerplant license, as well as an aircraft inspector's license. The avenue of advancement usually is mechanic to head mechanic (or crew chief), to inspector, to head inspector, to shop supervisor. In the airlines, a few supervisors may advance to executive positions. With additional business training, some may open their own repair shops.

Employment Outlook

The number of aircraft mechanics is expected to increase about as fast as the average for all occupations through the 1980's. In addition to jobs resulting from growth, many job openings will arise from the need to replace mechanics who transfer to other fields of work, retire, or die. However, job opportunities in general aviation, airline companies, and the Federal Government will differ.

Job opportunities in general aviation are expected to be good. The number of private aircraft as well as the number used by companies for executive transportation is expected to grow rapidly. Since wages in small companies frequently are low, there is less competition for jobs than in the airlines. Also, some additional jobs will become available as experienced mechanics leave for better paying jobs with airlines or large

private companies.

In contrast with general aviation, competition for airline jobs will be keen because the high wages attract more qualified applicants than there are jobs available. A growing population and rising incomes are expected to increase the demand for airline transportation. However, the introduction of large planes which require no more maintenance than the smaller ones now in use will limit mechanic employment.

Little change in the number of mechanics employed by the Federal Government is expected. Opportunities will fluctuate with changes in defense spending.

Sources of Additional Information

For General information about airplane mechanics, write to:

Aviation Maintenance Foundation
P.O. Box 739
Basin, WY 82410

Aviation Technician Education Council
205 Brisbane
Houston, TX 77061

Federal Aviation Administration
Mike Monroney Aeronautical Center, AAC-5
P.O. Box 25082, 6500 S. MacArthur
Oklahoma City, OK 73125

Information about jobs in a particular airline may be obtained by writing to the personnel manager of the company. For addresses of airline companies, write to:

Air Transport Association of America
1709 New York Ave. NW.
Washington, D.C. 20006.

For information on jobs in a particular area, contact employers at local airports or local offices of the State employment service.

*Occupational Outlook Handbook, 1980 ed.

AVIATION MECHANICS PROGRAM OBJECTIVE

Given appropriate instruction, as suggested by this guide, and in compliance with FAR Part 147, a student completing the program should demonstrate entry level skills in Airframe and Powerplant Mechanics in the areas of knowledge, theoretical structure, tool usage, diagnostic ability, related supportive skills and occupational survival skills.

As the student progresses through the program, sufficient competencies will be acquired to enable the student to enter the occupational field at the following D.O.T. Codes.*

Airframe and Powerplant Mechanic Helper	(D.O.T. Code 621.684-010)
Assembler, Aircraft Structures and Surfaces	(D.O.T. Code 806.381-026)
Mechanic, Aircraft Accessories	(D.O.T. Code 621.381-014)
Assembler, Aircraft Powerplant	(D.O.T. Code 806.381-026)
Mechanic, Field and Service	(D.O.T. Code 621.281-014)
Airframe and Powerplant Mechanic	(D.O.T. Code 621.281-014)

*Dictionary of Occupational Titles, 1977 ed.

DEFINITION OF D.O.T. CODE*

As a result of technological, economic and sociological influences, nearly every job in the economy is performed slightly differently from any other job. Every job is also similar to a number of other jobs. In order to look at the millions of jobs in an organized way, job titles are designated a 9-digit occupational code. Each set of three digits in the D.O.T. Code has a specific purpose or meaning that differentiates it from all other codes.

The first three digits of the D.O.T. Code identify a particular occupational group. In the code 652.382-010, the first digit indicates an occupational category. The second digit refers to a division within the occupational category. The third digit defines a specific occupational group within a division.

The middle three digits of the D.O.T. Code 652.382-010 are the worker function rating of the tasks performed in the occupation. Every job requires a worker to function, to some degree, in relation to data, people and things. A separate digit expresses the worker's relationship to each of these three groups. Worker functions involving more complex responsibility and judgment are assigned lower numbers while functions which are less complicated have high numbers.

The last three digits of the D.O.T. Code 652.382-010 indicate the alphabetical order of titles within 6-digit code groups. They serve to differentiate a particular occupation from all others. A number of occupations may have the same first six digits, but no two D.O.T. Code can have the same nine digits.

*Dictionary of Occupational Titles, 1977 ed.

621.684-010 AIRFRAME-AND-POWERPLANT MECHANIC HELPER (aircraft-aerospace mfg.; air trans.) airplane mechanic helper.

Assists AIRFRAME-POWERPLANT MECHANIC (aircraft-aerospace mfg.; air trans.) in servicing, reparing, and overhauling aircraft and aircraft engines, performing any combination of following duties: Adjusts and replaces parts, such as control cables, fuel tanks, spark plugs, and tires, using mechanics handtools. Disconnects instruments, ignition system, and fuel and oil lines. Aids in dismantling engines. Cleans engine parts with solvents. Aids in assembling engines, control cables, and aircraft sections, such as tail assemblies and wing sections. Inflates tires, fills gasoline tanks and oil reservoirs, and greases aircraft with grease gun. Performs other duties as described under HELPER (any ind.).

621.381-014 MECHANIC, AIRCRAFT ACCESSORIES (aircraft-aerospace mfg.) mechanic, accessory rework and repair.

Repairs, assembles, and tests aircraft accessories, such as power brake units, auxiliary electric motors, carburetors, spark ignitors, valves and hydramatic and vacuum pumps, using handtools and testing devices, and following shop orders and manufacturer's specifications: Disassembles unit, using hand or power wrenches and screwdrivers. Cleans parts, using cleaning solutions, and polishing and lapping compounds. Measures parts to determine wear, using micrometers and dial indicators. Replaces defective parts and reassembles units. Tests units for conformance to specifications under simulated operating conditions, using equipment, such as voltmeters and hydraulic testing equipment.

621.281-026 MECHANIC, FIELD AND SERVICE (aircraft-aerospace mfg.) engine service mechanic.

Inspects, tests and adjusts jet, prop jet, and propeller driven airplanes during and between test flights, following specifications: Opens engine throttle to full power and examines power plant to detect excess vibrators. Observes instruments to determine that factors, such as fuel and oil pressures, acceleration, and temperatures, meet specifications. Performs functional test of systems, such as landing gear and doors, rigging and controls, fuel, heating, ventilating, and pressurization, for conformance to specifications. Calibrates compasses and other directional equipment. Accompanies airplane on test and acceptance flights to make in-flight adjustments to controls. Records in log, during flights, work to be performed in shop or field to prepare airplane for delivery. Replaces malfunctioning parts, using handtools, portable power tools, precision measuring instruments, and testing

equipment. Workers may specialize in testing specific systems, such as hydraulic, electrical power, and structural.

621.281-014 AIRFRAME AND POWERPLANT MECHANIC (aircraft-aerospace mfg.; air trans.) aircraft mechanic; airplane mechanic.

Services, repairs, and overhauls aircraft and aircraft engines to insure airworthiness: Repairs, replaces, and assembles parts, such as wings, fuselage, tail assembly, landing gear, control cables, propeller assembly, and fuel and oil tanks, using tools, such as power shears, sheet metal breaker arc and acetylene welding equipment, rivet gun, and air or electric drills to rebuild or replace airframe or its components. Consults manufacturers manuals and airline's maintenance manual for specifications and to determine feasibility to repair or replacement according to malfunction. Examines engines for cracked cylinders and oil leaks and listens to detect sounds of malfunctioning, such as sticking or burnt valves. Inspects turbine blades to detect cracks to breaks. Tests engine operation, using testing equipment, such as ignition analyzer, compression checker, distributor timer, and ammeter to locate source of malfunction. Replaces or repairs worn to damaged components, such as carburetors, superchargers, and magnetos, using handtools, gages and testing equipment. Removes engine from aircraft, using hoist or fork-lift truck. Disassembles and inspects parts for wear, warping, or other defects. Repairs or replaces defective engine parts and reassembles and installs engine in aircraft. Adjusts and repairs electrical wiring system and aircraft accessories and instruments. Inspects, services, and repairs pneumatic and hydraulic systems. Performs miscellaneous duties to service aircraft, including flushing crankcase, cleaning screens, greasing moving parts, and checking brakes. May be required to be licensed by Federal Aviation Administration. May service engines and airframe components at line station making repairs, short of overhaul required to keep aircraft in safe operating condition and be designated AIRFRAME AND POWERPLANT MECHANIC, LINE SERVICE (air trans.). May specialize in engine repair and be designated as AIRCRAFT ENGINE ASSEMBLER (air trans.); AIRCRAFT ENGINE CYLINDER MECHANIC (air trans.); AIRCRAFT ENGINE DISMANTLER (aircraft-aerospace mfg.; air trans.); AIRCRAFT ENGINE INSTALLER (air trans.); AIRCRAFT ENGINE MECHANIC (air trans.); AIRCRAFT ENGINE MECHANIC, OVERHAUL (aircraft-aerospace mfg.; air trans.). Additional Titles: CARBURETOR MECHANIC (air trans.); HELICOPTER MECHANIC (aircraft-aerospace mfg.; air trans.); HYDRAULIC TESTER (air trans.); IGNITION SPECIALIST (air trans.); INSTRUMENT REPAIRER (aircraft-aerospace mfg.; air trans.); SUPERCHARGER MECHANIC (aircraft-aerospace mfg.; air trans.).

806.381-022 ASSEMBLER, AIRCRAFT POWERPLANT (aircraft-aerospace mfg.) aircraft assembler, power plant; engine-installation assembler.

Assembles and installs engines and auxiliary parts in aircraft, using handtools and following specifications: Positions engine in engine mount bolted on portable stand, using chain hoist. Bolts and clamps engine auxiliaries, such as carburetors, generators, fuel and oil pumps, and magnetos, in position, using handtools. Connects electric cables to terminals and tightens bolts and clamps supporting cable system, using handtools and soldering iron. Hoists engine and attached mount to position in fuselage or wing, and bolts mount to firewall of airplane. Installs insulation around engine and clamps or screws connections of wiring system, fuel and oil lines, pressure gages, and engine control rods to corresponding fittings on firewall. Turns turnbackles and setscrews to adjust engine controls after engine is installed. Positions propeller, using hoist, and alines and bolts it to engine, using engine, using handtools. May uncrate engines and clean parts with solvent and airhose before fastening them in mount. May perform preinstallation tests on engines to verify performance with established standards, using testing equipment, such as compression checker and distributor timer.

806.381-026 ASSEMBLER, AIRCRAFT, STRUCTURES AND SURFACES (aircraft-aerospace mfg.)

Assembles tail, wing, and fuselage sections of airplaces, space vehicles, and missiles from subassembles, such as frames, bulkheads, doors, stabilizers, and landing gear, following blueprints and using handtools and measuring instruments: Positions subassemblies in jigs or fixtures in relation to each other, using measuring instruments, such as protractors, and dividers, following blueprint station lines and index points. Drills, reams, and countersinks holes in subassemblies, using power drill. Bolts, rivets, or tack-welds assemblies together, using rivet gun, welding equipment, and handtools. Shapes adjoining edges to specifications, using tinsnips and files, and verifies tolerances between edges, using gages and calipers. Locates holes to be drilled in structure for installation of parts, such as engine cowl, wing nacelle, and wiring, using jigs, templates, scales, and square. Drills holes in structure and attaches brackets, hinges, braces, clips, and tubing to secure subassemblies and parts. Installs such units as doors, sheet metal and glass sections, landing gear, rudders, and elevators, and connects them to controls with pulleys and cables, using riveting gun, power drill, and handtools. Fits sheet metal sections to skeleton frame for covering and reinforcement.

*Dictionary of Occupational Titles, 1977 ed.

TASK LISTING BY DOT CODE

AVIATION MECHANICS

*DENOTES SECONDARY EXPECTANCY

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS: DOT NO. 621.684-010 Air-Frame and Power-Plant Mechanic Helper	621.381-014 Mechanic, Aircraft Accessories	621.281-026 Mechanic, Field and Service	621.281-014 Air-Frame and Power-Plant Mechanic	806.381-022 Assembler, Aircraft Power Plant	806.381-026 Assembler, Aircraft Structures and Surfaces
GENERAL CURRICULUM							
	DUTY I: Mathematics						
GA-01	Extracting roots and raising						
	numbers to a given power		X	X	X	X	X
GA-02	Determining areas and volumes of						
	various geometrical shapes		X	X	X	X	X
GA-03	Solving ratio, proportion and						
	percentage problems		X	X	X	X	X
GA-04	Performing algebraic operations						
	involving addition, subtraction,						
	multiplication and division of						
	positive and negative numbers		X	X	X	X	X
	DUTY II - Aircraft Drawings						
*GA-05	Using drawings, symbols and						
	schematic diagrams	X	X	X	X	X	X

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		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
*GA-06	Drawing sketches of repairs and alterations		X	X	X	X	X	X
*GA-07	Using blueprint information		X	X	X	X	X	X
*GA-08	Using graphs and charts		X	X	X	X	X	X
	DUTY III - Basic Physics							
*GA-09	Using the principles of simple machines: sound, fluid and heat dynamics			X	X	X		
	DUTY IV - Basic Electricity							
GA-10	Determining the relationship of voltage, current and resistance in electrical circuits			X	X	X	X	X
GA-11	Measuring voltage, current, resistance, continuity and leakage			X	X	X	X	X

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		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
GA-12	Measuring capacitance and induc-							
	tance			X	X	X	X	X
GA-13	Calculating and measuring electri-							
	cal power			X	X	X	X	X
*GA-14	Reading and interpreting electrical							
	circuit diagrams		X	X	X	X	X	X
*GA-15	Inspecting and servicing batteries		X	X	X	X	X	X
GA-16	Overhauling aircraft electrical							
	components			X	X	X	X	X
	DUTY V - Fluid Lines And Fittings							
*GA-17	Fabricating and installing rigid							
	flexible fluid lines and fittings		X	X	X	X	X	X
	DUTY VI - Materials And Processes							
GA-18	Performing precision measurements			X	X	X	X	X

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		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
*GA-19	Identifying and selecting aircraft hardware and materials		X	X	X	X	X	X
GA-20	Performing basic heat-treating processes			X	X	X	X	X
*GA-21	Performing penetrant, chemical etching and magnetic particle inspections		X	X	X	X	X	X
*GA-22	Inspecting and checking welds		X	X	X	X	X	X
*GA-23	Identifying and selecting appropriate nondestructive testing methods		X	X	X	X	X	X
	DUTY VII - Cleaning And Corrosion Control							
*GA-24	Identifying and selecting cleaning materials		X	X	X	X	X	X
*GA-25	Performing aircraft cleaning and corrosion control		X	X	X	X	X	X

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		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
	DUTY VIII - Ground Operation And Servicing							
*GA-26	Identifying and selecting fuels		X	X	X	X	X	X
*GA-27	Starting, ground operating, moving, servicing and securing aircraft		X		X	X	X	X
	DUTY IX - Maintenance Publications							
*GA-28	Selecting and using FAA and manufacturer's aircraft maintenance specifications, data sheets, manuals, publications and related Federal Aviation Regulations		X	X	X	X	X	X
*GA-29	Reading technical data		X	X	X	X	X	X

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		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
	DUTY X - Mechanic Privileges And							
	Limitations							
*GA-30	Exercising mechanic privileges							
	within the limitations prescribed							
	by FAR 65		X	X	X	X	X	X
	DUTY XI - Maintenance Forms And							
	Records							
*GA-31	Writing description of aircraft							
	condition and work performed		X	X	X	X	X	X
*GA-32	Completing required maintenance							
	forms, records and inspection reports		X	X	X	X	X	X
	DUTY XII - Aircraft Weight And Balance							
*GA-33	Weighing aircraft		X		X	X	X	X

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		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
GA-34	Performing complete weight and balance check and recording data				X	X	X	X

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		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
AIRFRAME CURRICULUM								
	DUTY I - Wood Structures							
AF-01	Identifying wood defects				X	X		X
AF-02	Inspecting wood structures				X	X		X
AF-03	Servicing and repairing wood structures				X	X		X
	DUTY II - Fabric Covering							
AF-04	Selecting and applying fabric and fiberglass				X	X		X
AF-05	Inspecting, testing and repairing fabric and fiberglass				X	X		X

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		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
	DUTY III - Aircraft Finishes							
*AF-06	Applying trim, letters and touch-up							
	paint		X		X	X		
*AF-07	Identifying and selecting aircraft							
	finishing materials		X		X	X		
*AF-08	Applying paint and dope		X		X	X		
AF-09	Inspecting finishes and identifying							
	defects				X	X		
	DUTY IV - Sheet Metal Structures							
*AF-10	Installing conventional rivets		X		X	X		X
*AF-11	Installing special rivets and							
	fasteners		X		X	X		X
AF-12	Handforming, laying out and							
	bending sheet metal				X	X		X
AF-13	Inspecting and repairing sheet							
	metal structures				X	X		X

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		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
AF-14	Inspecting bonded structures				X	X		X
AF-15	Inspecting and repairing plastics,							
	honeycomb and laminated structures				X	X		X
AF-16	Inspecting, checking, servicing and							
	repairing windows, doors and interior							
	furnishings				X	X		X
	DUTY V - Welding							
AF-17	Soldering, brazing and arc welding							
	steel					X		X
AF-18	Fabricating tubular structures					X		X
AF-19	Soldering stainless steel					X		
AF-20	Welding stainless steel and aluminum					X		
AF-21	Welding magnesium and titanium					X		
	DUTY VI - Assembly and Rigging							
AF-22	Rigging fixed wing aircraft				X	X		X

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AVIATION MECHANICS

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POSSIBLE EXIT POINTS

TASK NO.	TASK NAME	DOT NO. 621.684-010 Air-Frame and Power-Plant Mechanic Helper	621.381-014 Mechanic, Aircraft Accessories	621.281-026 Mechanic, Field and Service	621.281-014 Air-Frame and Power-Plant Mechanic	806.381-022 Assembler, Aircraft Power Plant	806.381-026 Assembler, Aircraft Structures and Surfaces
AF-23	Rigging rotary wing aircraft			X	X		X
AF-24	Checking alignment of structures			X	X		X
AF-25	Assembling aircraft			X	X		X
AF-26	Balancing and rigging movable surfaces			X	X		X
*AF-27	Jacking aircraft	X		X	X		X
	DUTY VII - Airframe Inspection						
AF-28	Performing 100-hour or annual inspection			X	X		
	DUTY VIII - Aircraft Electrical Systems						
*AF-29	Installing, checking and servicing airframe electrical wiring, controls, switches, indicators and protective devices	X		X	X		

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AVIATION MECHANICS

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		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
AF-30	Inspecting, checking, trouble-							
	shooting, servicing and repairing							
	alternating current and direct							
	current electrical systems				X	X		
AF-31	Repairing aircraft electrical							
	system components				X	X		
	DUTY IX - Hydraulic and Pneumatic							
	Power Systems							
*AF-32	Identifying and selecting							
	hydraulic fluids		X		X	X		
AF-33	Repairing hydraulic and pneumatic							
	power system components			X		X		
AF-34	Inspecting, checking, servicing,							
	troubleshooting and repairing							
	hydraulic and pneumatic power systems				X	X		

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AVIATION MECHANICS

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		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
	DUTY X - Aircraft Landing Gear							
	Systems							
AF-35	Inspecting, checking, servicing							
	and repairing landing gear,							
	retraction systems, shock struts,							
	brakes, wheels, tires and steering							
	systems			X	X			
	DUTY XI - Position and Warning							
	Systems							
AF-36	Inspecting, checking and servicing							
	speed and takeoff-warning systems							
	and anti-skid electrical brake							
	controls			X	X			

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AVIATION MECHANICS

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		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
AF-37	Inspecting, checking, trouble-							
	shooting, servicing and repairing							
	landing gear position indicating							
	and warning system				X	X		
	DUTY XII - Aircraft Instrument							
	Systems							
AF-38	Installing instruments				X	X		
AF-39	Inspecting, checking, servicing,							
	troubleshooting and repairing							
	heading, speed, altitude, time,							
	attitude, temperature, pressure							
	and position indicating systems				X	X		

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AVIATION MECHANICS

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		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
	DUTY XIII - Aircraft Fuel Systems							
AF-40	Inspecting, checking, servicing,							
	troubleshooting and repairing							
	aircraft fuel systems				X	X		
AF-41	Repairing aircraft fuel system							
	components			X		X		
AF-42	Inspecting and repairing fuel							
	quantity indicating systems				X	X		
AF-43	Inspecting, checking and repairing							
	pressure fueling systems				X	X		
AF-44	Checking and servicing fuel dump							
	systems				X	X		
*AF-45	Performing fuel management transfer							
	and defueling		X		X	X		
AF-46	Troubleshooting, servicing and							
	repairing fluid pressure and							
	temperature warning systems					X		

TASK LISTING BY DOT CODE

AVIATION MECHANICS

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		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
	DUTY XIV - Communications And							
	Navigation Systems							
AF-47	Inspecting, checking and servicing							
	auto-pilot and approach control							
	systems					X		
AF-48	Inspecting, checking and servicing							
	aircraft electronic communication							
	and navigation systems				X	X		
AF-49	Inspecting and repairing antenna and							
	electronic equipment installations				X	X		
	DUTY XV - Cabin Atmosphere Control							
	Systems							
AF-50	Inspecting, checking, trouble-							
	shooting, servicing and repairing							
	heating, cooling, air conditioning							
	and pressurization systems				X	X		

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		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
AF-51	Inspecting, checking, trouble-							
	shooting, servicing and repairing							
	oxygen systems				X	X		
AF-52	Repairing, heating, cooling, air							
	conditioning, pressurization and							
	oxygen system components			X		X		
	DUTY XVI - Ice And Rain Control							
AF-53	Inspecting, checking, trouble-							
	shooting, servicing and repairing							
	airframe ice and rain control systems				X	X		
	DUTY XVII - Fire Protection Systems							
AF-54	Inspecting, checking and servicing							
	smoke and carbon monoxide detection							
	systems				X	X		

TASK LISTING BY DOT CODE

AVIATION MECHANICS

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		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
AF-55	Inspecting, checking, servicing, troubleshooting and repairing aircraft fire detection and extinguishing systems			X	X			

TASK LISTING BY DOT CODE

AVIATION MECHANICS

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		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
POWERPLANT CURRICULUM								
	DUTY I - Lubrication Systems							
*PP-01	Identifying and selecting lubricants		X	X	X	X	X	
PP-02	Inspecting, checking, servicing,							
	troubleshooting and repairing							
	engine lubrication systems				X	X		
PP-03	Repairing engine lubrication system							
	components					X		
	DUTY II - Engine Fuel Systems							
PP-04	Inspecting, checking, servicing,							
	troubleshooting and repairing engine							
	fuel systems				X	X		
PP-05	Repairing engine fuel system com-							
	ponents			X		X		

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		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
	DUTY III - Fuel Metering Systems							
PP-06	Inspecting, checking, servicing,							
	troubleshooting and repairing							
	reciprocating and turbine engine							
	fuel metering systems				X	X		
PP-07	Overhauling carburetors			X		X		
PP-08	Repairing engine fuel metering							
	system components			X		X		
PP-09	Inspecting, checking and servicing							
	water injection systems				X	X		
	DUTY IV - Induction Systems							
PP-10	Inspecting, checking, troubleshooting,							
	servicing and repairing engine ice and							
	rain control systems				X	X		

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*DENOTES SECONDARY EXPECTANCY

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS					
		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
PP-11	Inspecting, checking, servicing							
	and repairing heat exchangers and							
	superchargers				X	X		
PP-12	Inspecting, checking, servicing							
	and repairing carburetor air intake							
	and induction manifolds				X	X		
	DUTY V - Engine Cooling Systems							
PP-13	Inspecting, checking, troubleshooting,							
	servicing and repairing engine cooling							
	systems				X	X		
PP-14	Repairing engine cooling system							
	components			X		X		

TASK LISTING BY DOT CODE

AVIATION MECHANICS

*DENOTES SECONDARY EXPECTANCY

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS					
		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
	DUTY VI - Engine Exhaust Systems							
PP-15	Inspecting, checking, troubleshooting,							
	servicing and repairing engine exhaust							
	systems				X	X		
PP-16	Repairing engine exhaust system							
	components			X		X		
	DUTY VII - Ignition Systems							
PP-17	Overhauling magneto and ignition							
	harness			X		X		
PP-18	Inspecting, checking, servicing,							
	troubleshooting and repairing							
	reciprocating and turbine engine							
	ignition systems				X	X		
PP-19	Repairing engine ignition system							
	components			X		X		

TASK LISTING BY DOT CODE

AVIATION MECHANICS

*DENOTES SECONDARY EXPECTANCY

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS					
		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
	DUTY VIII - Engine Electrical Systems							
PP-20	Installing, checking and servicing							
	engine electrical wiring, controls,							
	switches, indicators and protective							
	devices				X	X		
PP-21	Repairing engine electrical system							
	components				X	X		
	DUTY IX - Engine Instrument Systems							
PP-22	Inspecting, checking, servicing,							
	troubleshooting and repairing							
	engine temperature, pressure and							
	RPM indicating systems				X	X		
PP-23	Troubleshooting, servicing and							
	repairing fluid rate of flow							
	indicating systems					X		

TASK LISTING BY DOT CODE

AVIATION MECHANICS

*DENOTES SECONDARY EXPECTANCY

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS					
		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
	DUTY X - Engine Fire Protection							
	Systems							
PP-24	Inspecting, checking, servicing,							
	troubleshooting and repairing engine							
	fire detection and extinguishing							
	systems				X	X		
	DUTY XI - Propellers							
PP-25	Inspecting, checking, servicing							
	and repairing fixed-pitch, constant-							
	speed, feather propeller and propel-							
	ler governing systems				X	X		
PP-26	Installing, troubleshooting and							
	removing propellers					X	X	
PP-27	Inspecting, checking, servicing							
	and repairing propeller synchro-							
	nizing and ice control systems				X	X		

TASK LISTING BY DOT CODE

AVIATION MECHANICS

*DENOTES SECONDARY EXPECTANCY

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS					
		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
*PP-28	Identifying and selecting propeller lubricants		X	X	X	X	X	
PP-29	Balancing propellers					X		
PP-30	Repairing propeller control system components				X	X		
	DUTY XII - Reciprocating Engines							
PP-31	Overhauling reciprocating engines					X		
PP-32	Inspecting and repairing reciprocating engines				X	X		
PP-33	Inspecting, checking, servicing and repairing opposed and radial engines and reciprocating engine installations				X	X		
PP-34	Installing, troubleshooting and removing reciprocating engines					X	X	

TASK LISTING BY DOT CODE

AVIATION MECHANICS

*DENOTES SECONDARY EXPECTANCY

TASK NO.	TASK NAME	POSSIBLE EXIT POINTS					
		DOT DESCRIPTIONS	Air-Frame and Power-Plant Mechanic Helper	Mechanic, Aircraft Accessories	Mechanic, Field and Service	Air-Frame and Power-Plant Mechanic	Assembler, Aircraft Power Plant	Assembler, Aircraft Structures and Surfaces
		DOT NO.	621.684-010	621.381-014	621.281-026	621.281-014	806.381-022	806.381-026
	DUTY XIII - Turbine Engines							
PP-35	Overhauling turbine engines					X		
PP-36	Inspecting, checking, servicing and							
	repairing turbine engine installations				X	X		
PP-37	Installing, troubleshooting and							
	removing turbine engines					X	X	
	DUTY XIV - Engine Inspection							
PP-38	Performing powerplant conformity							
	and airworthiness inspection					X	X	X

FEDERAL AVIATION REGULATIONS, PART 147

Aviation maintenance technician schools desiring to be certified by the Federal Aviation Administration must meet specifications outlined in Federal Aviation Regulations, Part 147. This regulation describes the requirements for issuing school certificates and the general operating rules.

Subpart B of Part 147 specifies space requirements, instructional equipment, tools and shop equipment and the general curriculum and instructor requirements. Subpart C outlines the requirements for attendance, enrollment, evaluation, credit for prior experience, guidelines for student recordkeeping, graduation certificates and maintenance of the instructional program. This guide meets and exceeds FAA curriculum requirements and provides valuable assistance in achieving program objectives.

Administrators and instructors will find the Aviation Mechanics Curriculum Guide to be an invaluable resource in planning new programs and in managing and enhancing the learning activities for established programs.

SECTION III

UNIT GUIDES

SECTION III

Section III Content List

Unit Guide Description
Suggested Sequence of Unit Guides

In Section II, the relationship between the occupational area and program tasks was introduced. Section III continues this development by presenting, for each task, a unit guide for instructional planning and execution.

The instruction of specific tasks is central to vocational education. However, the value of a single task/competency to the student as a prospective member of the workforce is dependent upon the way in which that task/competency is related to other tasks and to the entire occupational area. Therefore, the Aviation Mechanic Program Task Listing provides a sample organizational model for sequencing the instruction of program tasks.

UNIT GUIDES

Description

In this section the tasks to be taught in each course are presented in sequential order. Each task is listed on a separate page so that it may be taken out of the guide for daily lesson planning or regrouped with other tasks to fit the individual teacher's preference for teaching order. The task pages may be used for planning and executing group instruction or for individualized instruction. Each page in the UNITS GUIDES section contains the following information:

TASK: This is a short and concise statement of the task to be taught. Also, the level of proficiency at which each task should be taught is indicated by "leveling".

Level 1 requires:
(a) Knowledge of general principles, but no practical application.
(b) No development of manipulative skill.
(c) Instruction by lecture, demonstration and discussion.

Level 2 requires:
(a) Knowledge of general principles and limited practical application.
(b) Development of sufficient manipulative skill to perform basic operations.
(c) Instruction by lecture, demonstration, discussion and limited practical application.

Level 3 requires:
(a) Knowledge of general principles and performance of a high degree of practical application.
(b) Development of sufficient manipulative skill to accomplish return to service.
(c) Instruction by lecture, demonstration, discussion and a high degree of practical application.

PERFORMANCE OBJECTIVE: The performance expected of the

student after completing the unit is stated in stem form, without a specific statement of all conditions, equipment and performance standard (these are listed in a criterion referenced measure in the Evaluation section of the task page). Definitions of terms used in the objective are as follows: (1) "Inspecting" - examining by sight and touch, (2) "Checking" - verifying proper operation, (3) "Troubleshooting" - analyzing and identifying malfunctions, (4) "Servicing" - performing functions that assure continued operation, (5) "Repairing" - correcting a defective condition (repairing an airframe or powerplant system includes component replacement and adjustment, but not component repair) and (6) "Overhauling" - disassembling, inspecting, repairing and checking operation.

INSTRUCTIONAL ACTIVITIES: Suggested learning activities are presented. These activities include providing information, demonstration, practical applications and projects. The practical applications are also "leveled" to guide the instructor in assigning appropriate projects.

INSTRUCTIONAL MATERIALS: Suggested materials for carrying out the instructional activities are listed. These include textbooks, audiovisuals and equipment. Textbooks are referenced by author and title with the complete reference contained in

the textbook list in the Instructional Resources section.

EVALUATION: This section contains a criterion referenced measure and reference to any test items or other evaluation measures that are available to the teacher.

CLASS/LAB HOURS: The estimated time for completion of the instructional activities and the evaluation are indicated in both classroom and lab hours. Total instructional time would be the sum of these.

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TASK

GA-01 Extracting roots and raising numbers to a given power (Level 1)

PERFORMANCE OBJECTIVE

Recognize and apply formulas involving the power of a number.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Basic mathematic procedures
b. Powers and roots computation

Provide Demonstration On:

a. Raising a number to a given power
b. Computation of a square root
c. Powers of ten added and subtracted

Provide Practical Application On:

Solving problems involving roots and powers (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

FAA, AC65-9A: General Handbook

Student Manuals:

Oregon, Individualized Math Problems in Aviation Mechanics

Tools and Equipment:

a. Pencil
b. Paper
* c. Calculator (optional)

*Note: FAA allows the use of calculator during licensing written test.

LAB HOURS 0

CLASS HOURS 3

EVALUATION (GA-01)

a. Given a math workbook and formulas, the learner will recognize and calculate formulas that contain problems of roots and powers. Minimum acceptable score is 70% correct.

b. Allen, National Study, Phase III, General Curriculum, "Mathematics."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

TASK

GA-02 Determining areas and volumes of various geometrical shapes (Level 2)

PERFORMANCE OBJECTIVE

Calculate areas and volumes of various geometrical shapes.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Basic mathematic procedures
b. Basic geometry
c. Computing area
d. Computing the volume of solids

Provide Demonstration On:

a. Computing area of
   1. Rectangle
   2. Square
   3. Triangles
   4. Circles
   5. Trapezoid
   6. Wing
b. Computing the volume of
   1. Rectangle
   2. Cube
   3. Cylinder

Provide Practical Application On:

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. Aviation Maintenance Publishers, Applied Science for the Aviation Technician

A/Vs:

Aviation Maintenance Publishers, "Measurement of Area and Volume," video tape ITP-G-100

Student Manuals:

Oregon, Individualized Math Problems in Aviation Mechanics

Tools and Equipment:

a. Pencil
b. Paper
c. Calculator (optional)

LAB HOURS 2

CLASS HOURS 4

EVALUATION (GA-02)

a. Given a math workbook and formulas, the learner will recognize and calculate ten problems of area and volume of various geometrical shapes. The arithematic solution must be accurate to a two place decimal.

b. Allen, National Study, Phase III, General Curriculum, "Mathematics."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

a. Solving problems involving area and volume of different geometrical shapes (Level 2)
b. Computing wing area (Level 2)
c. Calculating volume of luggage compartments and fuel tanks (Level 2)
d. Computing piston displacement (Level 2)

TASK

GA-03 Solving ratio, proportion and percentage problems (Level 3)

PERFORMANCE OBJECTIVE

Solve problems involving ratio, proportion and percentage.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Basic mathematic procedures
b. Computation of ratio, proportion and percentage

Provide Demonstration On:

a. Finding the ratio of two quantities
b. Finding the quantity of the first term
c. Finding the quantity of the second term
d. Direct proportion
e. Inverse proportion
f. Percentage

Provide Practical Application On:

a. Converting fractional number to decimal equivalents (Level 3)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

FAA, AC65-9A: General Handbook

Student Manuals:

Oregon, Individualized Math Problems in Aviation Mechanics

Tools and Equipment:

a. Pencil
b. Paper
c. Calculator (optional)

LAB HOURS 2

CLASS HOURS 3

EVALUATION (GA-03)

a. Given a math workbook and formulas, the learner will solve five problems each of ratio, proportion and percentage. Minimum acceptable score is 70% correct.

b. Allen, National Study, Phase III, General Curriculum, "Mathematics."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

b. Determining ratio and percentage of numbers (Level 3)

c. Computing compression ratio (Level 3)

TASK

GA-04 Performing algebraic operations involving addition, subtraction, multiplication and division of positive and negative numbers (Level 3)

PERFORMANCE OBJECTIVE

Compute algebraic problems involving addition, subtraction, multiplication and division of positive and negative numbers.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Basic mathematic procedures
b. Basic laws of algebra
c. Positive and negative numbers

Provide Demonstration On:

a. A scale of signed numbers
b. A simple weight and balance problem
c. Algebraic operations of
   1. Addition
   2. Subtraction
   3. Multiplication
   4. Division

Provide Practical Application On:

Solving algebraic problems involving addition, subtraction, multiplication and division of positive and negative numbers (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

FAA, AC65-9A: General Handbook

Student Manuals:

Oregon, Individualized Math Problems in Aviation Mechanics

Tools and Equipment:

a. Pencil
b. Paper
c. Calculator (optional)

LAB HOURS 3

CLASS HOURS 3

EVALUATION (GA-04)

a. Given a math workbook and formulas, the learner will solve four word problems each of addition, subtraction, multiplication and division of positive and negative numbers. Minimum acceptable score is 70% correct.

b. Allen, National Study, Phase III, General Curriculum, "Mathematics."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

TASK

GA-05 Using drawings, symbols and schematic diagrams (Level 2)

PERFORMANCE OBJECTIVE

Identify and interpret drawings, symbols and schematic diagrams.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Prints
b. Working drawings
c. Care and use of drawings
d. Title block
e. Bill of material
f. Methods of illustrating objects
g. Meaning of lines

Provide Demonstration On:

a. Care and use of drawings
b. Interpretation of lines and symbols

Provide Practical Application On:

a. Identifying lines and symbols (Level 2)
b. Interpreting dimensions (Level 2)
c. Interpreting electrical system drawings (Level 2)
d. Using installation diagrams and schematics (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. McGraw-Hill, Aircraft Basic Science

A/Vs:

Aviation Maintenance Publishers, "Aircraft Drawings," video tape ITP-G-118

Tools and Equipment:

a. Aircraft drawings
b. Electrical drawings
c. Aircraft maintenance manuals

LAB HOURS 7

CLASS HOURS 7

EVALUATION (GA-05)

a. Given an aircraft drawing, the learner will identify the different lines and symbols and interpret the dimensions without error.

b. Given an electrical system drawing, the learner will identify the standard electrical symbols without error.

c. Given an aircraft drawing, the learner will locate assigned data and list dimensions and materials without error.

d. Allen, National Study, Phase III, General Curriculum, "Aircraft Drawings."

e. Acme, General Mechanic.

f. Acme, Practical Test, General Test Subjects.

g. FAA, AC65-20, General Written Test Guide.

TASK

GA-06 Drawing sketches of repairs and alterations (Level 3)

PERFORMANCE OBJECTIVE

Draw sketches of repairs and alterations.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Drawing sketches
b. Drawing symbols
c. Care and use of drafting instruments

Provide Demonstration On:

a. Basic drawing techniques
b. Care of drafting instruments

Provide Practical Application On:

Making sketches to reflect approved repairs and alterations (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43-13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. FAA, AC43-13-2A: Acceptable Methods, Techniques and Practices - Aircraft Alterations
d. McGraw-Hill, Aircraft Basic Science

Tools and Equipment:

a. Drafting equipment
b. Drawing paper

LAB HOURS 6

CLASS HOURS 4

EVALUATION (GA-06)

a. Given various aircraft repair data and necessary tools and equipment, the learner will prepare the necessary drawings to reflect the proper physical location of the repair or alteration and other required information. The drawings must conform to accepted industry practice.

b. Allen, National Study, Phase III, General Curriculum, "Aircraft Drawings."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

TASK

GA-07 Using blueprint information (Level 3)

PERFORMANCE OBJECTIVE

Use blueprint information.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Reading drawing
b. Diagrams
c. Microfilm

Provide Demonstration On:

a. Interpreting title block information
b. Interpreting bill of material
c. Relating the blueprint to the live aircraft

Provide Practical Application On:

a. Reading and interpreting drawings (Level 3)
b. Interpreting installation diagrams (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. McGraw-Hill, Aircraft Basic Science

Tools and Equipment:

a. Aircraft drawings
b. Live aircraft

LAB HOURS 6

CLASS HOURS 5

EVALUATION (GA-07)

a. Given an aircraft installation drawing, the learner will explain without error, all aspects of the installation with emphasis placed on the title block information, the bill of material and the physical location of the point of installation.

b. Allen, National Study, Phase III, General Curriculum, "Aircraft Drawings."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

TASK

GA-08 Using graphs and charts (Level 3)

PERFORMANCE OBJECTIVE

Use graphs and charts.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Interpreting or reading graphs and charts
b. Nomograms

Provide Demonstration On:

a. Electrical wire size chart
b. Horsepower vs. altitude chart
c. Weight and balance graph

Provide Practical Application On:

Using manufacturer's charts and graphs (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. FAA, AC43.13-2A: Acceptable Methods, Techniques and Practices - Aircraft Alterations
d. McGraw-Hill, Aircraft Basic Science

Tools and Equipment:

a. Aircraft charts
b. Aircraft graphs

LAB HOURS	2
CLASS HOURS	1

EVALUATION (GA-08)

a. Given various aircraft charts and graphs, the learner will locate the appropriate information. Plotting of information contained in the chart must be within a 10% tolerance.

b. Allen, National Study, Phase III, General Curriculum, "Aircraft Drawings."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

TASK

GA-09 Using the principles of simple machines: sound, fluid and heat dynamics (Level 2)

PERFORMANCE OBJECTIVE

Use the principles of simple machines: sound, fluid and heat dynamics.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Matter
b. Fluids
c. Temperature
d. Pressure
e. Kinetic theory of gases
f. Atmosphere
g. Bernoulli's Principle
h. Machines
i. Work, power and energy
j. Motion of bodies
k. Heat
l. Sound

Provide Demonstration On:

a. Engine and aircraft performance with respect to atmospheric conditions
b. Characteristics of matter with respect to temperature, pressure, velocity, altitude and sound
c. Mechanical advantage

Provide Practical Application On:

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. McGraw-Hill, Aircraft Basic Science
c. Aviation Maintenance Publishers, Applied Science for The Aviation Technician

A/Vs:

(Continued on back)

Tools and Equipment:

a. Engine mockup
b. Aircraft airfoil
c. Hydraulic mockup
d. Simple machines
   1. Wrench
   2. Gear
   3. Threaded bolt
   4. Pulley
e. Performance chart (engine and aircraft vs. density altitude)

LAB HOURS 2

CLASS HOURS 6

EVALUATION (GA-09)

a. Given a physics workbook of local makeup, the learner will work all problems. Minimum acceptable score is 70% correct.

b. Allen, National Study, Phase III, General Curriculum, "Basic Physics."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

a. Determining the relationship of temperature and heat (Level 2)
b. Determining the relationship between pressure, temperature and volume of air mass (Level 1)
c. Describing the factors effecting air pressure on an airfoil (Level 1)
d. Describing the physical factors effecting engine output power (Level 2)
e. Determining the relationship between pressure, area and force (Level 1)
f. Using the inclined plane, the level and the pulley (Level 1)
g. Describing the origin of sound (Level 1)
h. Using centrifugal/centripetal forces (Level 2)

INSTRUCTIONAL MATERIALS

A/Vs:

Aviation Maintenance Publishers, "Energy, Work, Power and Force," video tape ITP-G-101; "Newton's Laws of Motion," video tape ITP-G-107; "Temperature, Pressure, and Fluids," Part 1 & 2, video tape ITP-G-108, "Bernoulli's Principle - Why an Airplane Flies," video tape ITP-G-109; "Sound and It's Effects," video tape ITP-G-110

TASK

GA-10 Determining the relationship of voltage, current and resistance in electrical circuits (Level 3)

PERFORMANCE OBJECTIVE

Determine the relationship of voltage, current and resistance in electrical circuits.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Matter
b. Static electricity
c. Electromotive force
d. Current flow
e. Resistance
f. Basic circuit components and symbols
g. Ohm's Law
h. Series D.C. circuits
i. Parallel D.C. circuits
j. Series-parallel D.C. circuits
k. Voltage dividers
l. Rheostats and potentiometer
j. Magnetism

Provide Demonstration On:

a. Relationship of voltage and resistance to current
b. Calculation of resistance
c. Calculation of Ohm's law
d. Calculations of series, parallel and series-parallel circuits
e. Magnetic principles
f. Electro-magnetic induction
g. Operation of multimeter

Provide Practical Application On:

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles
c. McGraw-Hill, Aircraft Basic Science
d. Aviation Maintenance Publishers, Basic Electricity for A&P Mechanics

Tools and Equipment:

a. Multimeter
b. Assorted hand tools
c. Electrical wire (approx. AWG#20)
d. Assorted resistors
e. Relay, aircraft type 12 or 24 volt D.C.
f. Solenoid 12 or 24 volt D.C.

A/Vs:

(Continued on back)

LAB HOURS 12½

CLASS HOURS 14

EVALUATION (GA-10)

a. Given a circuit board with a switch, wire, resistor and multimeter, the learner will build a series circuit, a parallel circuit and a series-parallel circuit. Each will be connected to a D.C. power source and an individual measurement of voltage and current flow will be conducted and recorded without error. Computations of resistance, voltage, current and watts will be conducted on the constructed circuits and a comparison computed to measured values will be determined. One hundred percent accuracy is required.

b. Given a wire sample of certain length, the learner will determine the wire size and compute the resistance to within 20% of known value.

c. The learner will schematically draw a generator and a transformer and will explain the process of electromagnetic induction of each.

d. Allen, National Study, Phase III, General Curriculum, "Basic Electricity."

e. Acme, General Mechanic.

f. Acme, Practical Test, General Test Subjects.

g. FAA, AC65-20, General Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

a. Calculating circuit current (Level 3)
b. Calculating circuit voltage drop (Level 3)
c. Determining current carrying capacity of a wire (Level 2)
d. Calculating circuit electrical power (Level 3)
e. Measuring current flow in a parallel electrical circuit (Level 3)
f. Demonstrating characteristics of magnetism
   1. Relays
   2. Solenoids (Level 3)
g. Demonstrating the characteristics of electromagnetic induction
   1. Generators
   2. Transformers (Level 1)

INSTRUCTIONAL MATERIALS

A/Vs:

Aviation Maintenance Publishers, "Electron Theory," video tape ITP-G-111; "Sources of Electrical Energy," video tape ITP-G-114; "Basic Electricity," filmstrip EA-BE

TASK

GA-11 Measuring voltage, current, resistance, continuity and leakage (Level 3)

PERFORMANCE OBJECTIVE

Measure voltage, current, resistance, continuity and leakage in an electrical circuit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Circuit protective and control devices
b. Switches
c. D.C. measuring instruments
d. Multimeters
e. Voltmeters
f. Ohmmeter
g. A.C. measuring instruments

Provide Demonstration On:

Use and proper connecting techniques of:

a. Multimeter
b. Sensitive ammeter
c. Voltmeter
d. Ohmmeter

Provide Practical Application On:

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles
c. McGraw-Hill, Aircraft Basic Science
d. Aviation Maintenance Publishers, Basic Electricity for A&P Mechanics

Tools and Equipment:

a. Multimeter
b. Sensitive ammeter
c. Live aircraft or electrical mockup
d. A.C. circuit board
e. Assorted hand tools

A/Vs:

(Continued on back)

LAB HOURS 3

CLASS HOURS 4

EVALUATION (GA-11)

a. Given a multimeter, a sensitive ammeter and either a live aircraft or an electrical system mockup, the learner will measure load (current) and voltage drop at assigned locations. Additionally a check of airworthiness will be made to a switch. All readings must be within 5% of known values.

b. Given an A.C. circuit, the learner will measure voltage at assigned locations. All readings must be within 5% of known values.

c. Allen, National Study, Phase III, General Curriculum, "Basic Electricity."

d. Acme, General Mechanic.

e. Acme, Practical Test, General Test Subjects.

f. FAA, AC65-20, General Written Test Guide.

INSTRUCTIONAL ACTIVITIES	INSTRUCTIONAL MATERIALS
Provide Practical Application On: a. Determining the meaning of electrical quantity prefixes (Level 2) b. Using D.C. electrical instruments (Level 3) c. Connecting voltmeter and ommeters in circuit (Level 3) d. Using a voltohmmeter (Level 3) e. Using ohmmeter and/or test light for open or short circuits (Level 3) f. Detecting electrical leakage (Level 2) g. Measuring A.C. voltage (Level 3)	A/Vs: Aviation Maintenance Publishers, "Units of Electrical Measurement," video tape ITP-G-125; "D.C. Circuit Elements," video tape ITP-G-126; "D.C. Circuit Arrangement," video tape ITP-G-127

TASK

GA-12 Measuring capacitance and inductance (Level 1)

PERFORMANCE OBJECTIVE

Measure capacitance and inductance in an electrical A.C. circuit.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Alternating current and voltage
b. Inductance
c. Capacitance
d. Ohm's law for A.C. circuits
e. Transformers
f. Magnetic amplifiers

Provide Demonstration On:

a. Comparing D.C. to A.C.
b. Inductive reactance
c. Capacitive reactance
d. Impedance

Provide Practical Application On:

a. Computing capacitance, inductance and impedance (Level 1)
b. Measuring capacitance in aircraft applications (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles
c. Aviation Maintenance Publishers, Basic Electricity for A&P Mechanics

A/Vs:

(Continued on back)

Tools and Equipment:

a. Capacitor
b. Capacitor tester

LAB HOURS 2

CLASS HOURS 4

EVALUATION (GA-12)

a. Given mock values for an A.C. circuit that contains capacitors and inductors, the learner will compute capacitive reactance, inductive reactance and impedance without error.

b. Given a capacitor and capacitor tester, the learner will determine without error the capacity of the capacitor.

c. Allen, National Study, Phase III, General Curriculum, "Basic Electricity."

d. Acme, General Mechanic.

e. Acme, Practical Test, General Test Subjects.

f. FAA, AC65-20, General Written Test Guide.

INSTRUCTIONAL MATERIALS

A/Vs:

Aviation Maintenance Publishers, "Principles of Alternating Current," video tape ITP-G-116; "Inductance, Capacitance and Impedance," video tape ITP-G-117

TASK

GA-13 Calculating and measuring electrical power (Level 2)

PERFORMANCE OBJECTIVE

Calculate and measure electrical power of an electrical system.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Power in D.C. circuits
b. Power in A.C. circuits

Provide Demonstration On:

a. Working electrical power formulas
b. Electrical load check and conversion to power

Provide Practical Application On:

Determining aircraft electrical power requirements (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles
d. Aviation Maintenance Publishers, Basic Electricity for A&P Mechanics

Tools and Equipment:

a. Live aircraft or electrical system mockup
b. Sensitive ammeter
c. Assorted hand tools

LAB HOURS 2½

CLASS HOURS 2

EVALUATION (GA-13)

a. Given an aircraft electrical system, the learner will determine if the power requirements meet the output capabilities of the existing generator as found on the aircraft. One hundred percent accuracy is required.

b. Allen, National Study, Phase III, General Curriculum, "Basic Electricity."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

TASK

GA-14 Reading and interpreting electrical circuit diagrams (Level 3)

PERFORMANCE OBJECTIVE

Read and interpret electrical circuit diagrams.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

Basic circuit analysis and troubleshooting

Provide Demonstration On:

Using electrical schematics for reference and troubleshooting

Provide Practical Application On:

a. Identifying commonly used aircraft electrical and electronic symbols (Level 3)
b. Tracing circuits with aircraft wiring diagrams (Level 3)
c. Identifying electrical malfunctions by reference to circuit diagrams (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles
c. Aviation Maintenance Publishers, Basic Electricity for A&P Mechanics

Tools and Equipment:

a. Aircraft maintenance manuals
b. Electrical schematic handouts

LAB HOURS 3

CLASS HOURS 3

EVALUATION (GA-14)

a. Given an aircraft electrical schematic containing twenty-eight symbols, the learner will identify correctly at least twenty-two symbols, trace current flow and identify malfunctions from noted descrepancies.

b. Allen, National Study, Phase III, General Curriculum, "Basic Electricity."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

TASK

GA-15 Inspecting and servicing batteries (Level 3)

PERFORMANCE OBJECTIVE

Inspect and service aircraft batteries.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Storage batteries
b. Lead-acid batteries
c. Nickel-cadmium batteries

Provide Demonstration On:

a. Testing of batteries
b. Charging of batteries
c. Installation of batteries
d. Safety

Provide Practical Application On:

a. Inspecting and recharging an aircraft lead acid battery (Level 3)
b. Inspecting and recharging an aircraft nickel-cadmium battery (Level 2)
c. Performing removal, installation and compartment maintenance for aircraft batteries

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles
d. Aviation Maintenance Publishers, Basic Electricity for A&P Mechanics

A/Vs:

(Continued on back)

Tools and Equipment:

a. Live aircraft
b. Aircraft batteries
   1. Lead-acid type
   2. Nickel-cadmium type
c. Battery charging equipment
d. Voltmeter
e. Hydrometer
f. Face shield
g. Rubber gloves
h. Assorted hand tools

LAB HOURS 4½

CLASS HOURS 5½

EVALUATION (GA-15)

a. Given aircraft batteries (lead-acid type and nickel-cadmium type), the learner will service, charge, evaluate airworthiness and install them in accordance with the manufacturer's instructions.

b. Allen, National Study, Phase III, General Curriculum, "Basic Electricity."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

INSTRUCTIONAL MATERIALS

A/Vs:

a. Aviation Maintenance Publishers, "Aircraft Batteries," filmstrip EA-AB
b. Aviation maintenance Publishers, "Theory and Testing of Lead Acid Batteries," video tape ITP-G-128; "Theory and Testing of Nickel-Cadmium Batteries," video tape ITP-G-115

TASK

GA-16 Overhauling aircraft electrical components (Level 2)

PERFORMANCE OBJECTIVE

Overhaul an aircraft generator and motor and inspect their external circuits.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. D.C. generator and controls
b. Parelleling generator
c. D.C. generator maintenance
d. Alternators and controls
e. Alternator constant - speed drive
f. Syncronizing alternators
g. Alternator maintenance
h. Combined A.C. and D.C. electrical systems
i. Inverters
j. D.C. motors
k. A.C. motors
l. Motor maintenance

Provide Demonstration On:

a. D.C. generator disassembly, inspection, repair, reassembly and testing
b. A.C. generator disassembly, inspection, repair, reassembly and testing
c. Generator (both A.C. and D.C.) control inspection, adjustment and troubleshooting

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles

A/Vs:

Prestolite, "Aircraft Alternators," slide set

Tools and Equipment:

a. D.C. generator
b. A.C. generator of D.C. output type
c. Reversing D.C. motor
d. Live aircraft of electrical mockup
e. Multimeter
f. Growler tester
g. Various hand tools
h. Manufacturer's maintenance manuals

LAB HOURS 10½

CLASS HOURS 12½

EVALUATION (GA-16)

a. Given a D.C. generator, an A.C. generator (D.C. output type) and a D.C. motor, the learner will disassemble, inspect, repair, reassemble and test each in accordance with manufacturer's and FAA specifications. Test results must equal known values.

b. Given the following electrical systems, D.C. generator, A.C. generator (D.C. output type) and reversing D.C. motor, the learner will test the proper operation and make necessary adjustment to within manufacturer's specifications.

c. Allen, National Study, Phase III, General Curriculum, "Basic Electricity."

d. Acme, General Mechanic.

e. Acme, Practical Test, General Test Subjects.

f. FAA, AC65-20, General Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Demonstration On:

d. Motor (both A.C. and D.C.) disassembly, inspection, repair and testing
e. Motor (both A.C. and D.C.) controls, clutches and switches, inspection adjustment and troubleshooting

Provide Practical Application On:

a. Overhauling and testing both D.C. and A.C. generators (Level 2)
b. Overhauling and testing D.C. starter motor and a reversing motor (Level 2)
c. Testing, adjusting and troubleshooting A.C. and D.C. generator circuit and controls (Level 2)

TASK

GA-17 Fabricating and installing rigid and flexible fluid lines and fittings (Level 3)

PERFORMANCE OBJECTIVE

Fabricate and install rigid and flexible fluid lines and fittings.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Plumbing lines and connectors
b. Flexible hose
c. Tube forming process
d. Repair of metal tube lines
e. Fabrication and replacement of flexible hose
f. Installation of rigid tubing
g. Support clamps
h. Plumbing assembly precautions

Provide Demonstration On:

a. Bending and flaring metal tubing
b. Fabrication of flexible hoses
c. Installation of rigid and flexible lines

Provide Practical Application On:

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Basic Science

Tools and Equipment:

a. Aluminum tubing
b. Stainless steel tubing
c. Flexible hose and fittings
d. Live aircraft or plumbing mockup
e. Flaring tool
f. Beading tool
g. Flexible line fabrication tools
h. Prefabricated samples of tubing
i. Various hand tools

LAB HOURS 16½

CLASS HOURS 8½

EVALUATION (GA-17)

a. Given a sample of both aluminum and stainless tubing, the learner will bend to a 90° angle both pieces. All bends must meet return-to-service standards and conform to minimum bend radii rules.

b. Given samples of aluminum or copper tubing, the learner will form a bead on one sample and will completely fabricate a flare with appropriate fitting on the other. Bead and flare must meet MIL specifications.

c. Given flexible hose and fittings, the learner will completely fabricate a replacement hose assembly and install it. The hose must function without leaking under operating pressures.

d. Given five samples of aircraft tubing with defects, the learner will identify each without error.

e. Allen, National Study, Phase III, General Curriculum, "Fluid Lines and Fittings."

f. Acme, General Mechanic.

g. Acme, Practical Test, General Test Subjects.

h. FAA, AC65-20, General Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

a. Bending aluminum and stainless steel tube 90° (Level 3)
b. Performing beading of tubing (Level 3)
c. Fabricating flares on tubing (single and double flare) (Level 3)
d. Fabricating and installing flexible hoses (Level 3)
e. Inspecting metal tubing for defects (Level 3)

TASK

GA-18 Performing precision measurements (Level 3)

PERFORMANCE OBJECTIVE

Determine wear allowances and measure aircraft components using micrometers and other precision measurement tools.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Micrometers
b. Telescoping and small hole guages
c. Bore guages
d. Dial indicators
e. Tolerances and specifications

Provide Demonstration On:

a. Proper use of precision measuring equipment
b. Reading precision measuring equipment
c. Care of precision measuring equipment

Provide Practical Application On:

a. Using manufacturer's table of limits
b. Measuring inside and outside diameter
c. Determining clearance and fit between parts

INSTRUCTIONAL MATERIALS

Textbooks:

FAA, AC65-9A: General Handbook

A/Vs:

Aviation Maintenance Publishers, "Measuring and Layout Tools," video tape ITP-G-131; "Precision Measuring Instruments - The Micrometer Caliper," video tape ITPS-119; "Precision Measuring Instruments - The Vernier Caliper," video tape ITPS-120

Tools and Equipment:

a. Micrometer
b. Dial indicator
c. Bore guage
d. Small hole and telescoping guages
e. Aircraft components
f. Manufacturer's maintenance manuals

LAB HOURS 10

CLASS HOURS 2

EVALUATION (GA-18)

a. Given various aircraft parts requiring precision fit, the learner will measure at least one inside and one outside diameter and will measure the fit of two appropriate parts and determine airworthiness by comparing measurements to the manufacturer's table of limits on specifications. Measurements must be within specifications of known values.

b. Allen, National Study, Phase III, General Curriculum, "Materials and processes."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

TASK

GA-19 Identifying and selecting aircraft hardware and materials (Level 3)

PERFORMANCE OBJECTIVE

Identify and select aircraft hardware and materials according to FAA standards.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Aircraft hardware
b. Ferrous and nonferrous metals
c. Identification of aircraft metals and alloys (SAE, AISA)
d. Aircraft control cables
e. AN and NAS codes
f. Torque

Provide Demonstration On:

a. Identifying and selecting proper hardware
b. Identifying and selecting metals for different applications
c. Identifying and selecting control cables for each specific aircraft control system

Provide Practical Application On:

a. Identifying and installing aircraft bolts (Level 3)
b. Identifying aluminum and steel alloys (Level 3)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Basic Science

A/Vs:

(Continued on back)

Tools and Equipment:

a. Assorted aircraft hardware
b. Assorted ferrous and nonferrous metal samples
c. Assorted aircraft control cable samples

LAB HOURS 17

CLASS HOURS 21

EVALUATION (GA-19)

a. Given an assortment of 20 pieces of aircraft hardware, the learner will identify and install the proper hardware in accordance with return-to-flight standards.

b. Given 2 samples each of aluminum alloys and steel alloys, the learner will identify each and will relate the suitability of each for use in repairing different aircraft structures without error.

c. Given 5 samples of aircraft control cable, the learner will identify each with respect to type and size without error.

d. Allen, National Study, Phase III, General Curriculum, "Materials and Processes."

e. Acme, General Mechanic.

f. Acme, Practical Test, General Test Subjects.

g. FAA, AC65-20, General Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Demonstration On:

b. Identifying and selecting metals for different applications
c. Identifying and selecting control cables for each specific aircraft control system

INSTRUCTIONAL MATERIALS

A/Vs:

Aviation Maintenance Publishers, "Identification and Application of Aircraft Hardware," video tape ITP-G-129; "Identification of Metals," video tape ITP-G-132; "Nonmetallic Structural Materials," video tape ITP-G-133

TASK

GA-20 Performing basic heat-treating processes (Level 2)

PERFORMANCE OBJECTIVE

Perform basic heat-treating process on aircraft metals.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Principles of heat-treating
b. Heat treating equipment
c. Heat treating of ferrous and non-ferrous metals
d. Case hardening
e. Solution and precipitation heat treating
f. Annealing of aluminum alloys
g. Heat treating magnesium alloys
h. Heat treating titanium
i. Hardness testing

Provide Demonstration On:

a. Proper annealing process and safety precautions
b. Metal coding identification

Provide Practical Application On:

a. Annealing copper and steel parts (Level 2)
b. Identifying aluminum alloy code designation of heat-treatability (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair

Tools and Equipment:

a. Copper tubing
b. Various aluminum alloy samples
c. Oxyacetylene welding outfit
d. Quenching vat

LAB HOURS 1

CLASS HOURS 5

EVALUATION (GA-20)

a. Given a sample of copper tubing and necessary equipment, the learner will set up the equipment and anneal the tubing. The tubing must be capable of being formed around a radius equal to three times the diameter.

b. Given three samples of heat treated aluminum alloy, the learner will identify, with respect to coding, the heat treated value of each and relate their basic strength and malleability value without error.

c. Allen, National Study, Phase III, General Curriculum, "Materials and Processes."

d. Acme, General Mechanic.

e. Acme, Practical Test, General Test Subjects.

f. FAA, AC65-20, General Written Test Guide.

TASK

GA-21 Performing penetrant, chemical etching and magnetic particle inspections (Level 2)

PERFORMANCE OBJECTIVE

Perform penetrant, chemical etching and magnetic particle inspections on aircraft components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Magnetic particle inspection
b. Magnetizing and demagnetizing equipment
c. Dye-penetrant inspection
d. Local etching

Provide Demonstration On:

a. Operation of magnetic particle inspection equipment
b. Dye penetrant inspection procedures

Provide Practical Application On:

a. Performing dye penetrant inspection (Level 2)
b. Performing magnetic particle inspection (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair

A/Vs:

Aviation Maintenance Publishers, "Non-destructive Inspection-Dye Penetrant," video tape ITP-G-135; "Non-destructive Inspection-Magnetic Particle," video tape ITP-G-136

Tools and Equipment:

a. Various aluminum alloy aircraft parts
b. Various steel aircraft parts
c. Dye penetrant inspection kit
d. Magnetic particle inspection machine
e. Demagnetizer

LAB HOURS 8½

CLASS HOURS 4

EVALUATION (GA-21)

a. Given various defective aluminum alloy parts, the learner will perform a dye penetrant inspection in accordance with the penetrant manufacturer's instructions. All flaws or cracks must be located.

b. Given various defective steel parts, the learner will inspect each, both longitudinally and circularly, by the magnetic particle method of inspection. All flaws or cracks must be located.

c. Allen, National Study, Phase III, General Curriculum, "Materials and Processes."

d. Acme, General Mechanic.

e. Acme, Practical Test, General Test Subjects.

f. FAA, AC65-20, General Written Test Guide.

TASK

GA-22 Inspecting and checking welds (Level 3)

PERFORMANCE OBJECTIVE

Inspect and check welds on aircraft structures.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Visual inspection of welds
b. Optical aids
c. X-ray technique
d. Pentrant and magnetic particle method
e. Unacceptable defects
f. Rewelding of a joint
g. Stresses in welded joints

Provide Demonstration On:

Determining acceptability of welds

Provide Practical Application On:

Inspecting and evaluating welds (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair

Tools and Equipment:

a. Various weld samples
b. 10 power magnifying glass
c. Dye penetrant or zyglo

LAB HOURS 4

CLASS HOURS 1

EVALUATION (GA-22)

a. Given welded samples containing faults, the learner will inspect, evaluate and relate the discrepancies noted. The decision of acceptance or rejection will be correct for at least eight out of ten welded aircraft assemblies. At least 80% of the defects must be valid in accordance with available written standards.

b. Allen, National Study, Phase III, General Curriculum, "Materials and Processes."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

TASK

GA-23 Identifying and selecting appropriate non-destructive testing methods (Level 1)

PERFORMANCE OBJECTIVE

Identify and select appropriate non-destructive testing methods for aircraft components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Radiography
b. Ultrasonic testing
c. Eddy current testing
d. Magnetic particle inspection
e. Dye penetrant inspection

Provide Demonstration On:

Uses and procedures involved in

a. Radiology
b. Ultrasonics
c. Eddy currents
d. Magnetic particle
e. Dye penetrant

Provide Practical Application On:

Choosing the proper non-destructive testing method for given aircraft sections or components (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. FAA, AC43-3: Non-Destructive Testing in Aircraft
d. FAA, AC43-7: Ultrasonic Testing for Aircraft

Tools and Equipment:

Manufacturer's maintenance manuals in aircraft

LAB HOURS 0

CLASS HOURS 7

EVALUATION (GA-23)

a. Given a list of 25 engine parts and aircraft sections and the possible defects each may contain, the learner will select the best method of non-destructive testing for detection of each. Seventy percent must be correctly identified.

b. Allen, National Study, Phase III, General Curriculum, "Materials and Processes."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

TASK

GA-24 Identifying and selecting cleaning materials (Level 3)

PERFORMANCE OBJECTIVE

Identify and select proper cleaning materials for aircraft and their components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Aircraft exterior and interior cleaning
b. Powerplant cleaning (blasting)
c. Types of cleaning agents
d. Mechanical cleaning
e. Caution on cleaning aluminum parts
f. Sonic cleaning
g. Safety

Provide Demonstration On:

a. Selecting proper cleaning compounds
b. Using proper methods

Provide Practical Application On:

a. Identifying caustic cleaners (Level 3)
b. Identifying cleaning agents for aircraft engine parts (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC-65-9A: General Handbook
b. Aviation Maintenance Publishers, Aircraft Corrosion Control

A/Vs:

Aviation Maintenance Publishers, "Corrosion Detection, Removal, Treatment and Protection," video tape ITP-G-134; "Aircraft Corrosion Control," filmstrip EA-CC

Tools and Equipment:

a. Aircraft maintenance manual
b. Engine overhaul manual
c. Samples of cleaning agents
d. Parts to be cleaned

LAB HOURS 8

CLASS HOURS 4

EVALUATION (GA-24)

a. Given an aircraft maintenance manual, the learner will determine all acceptable cleaning compounds for complete aircraft cleaning.

b. Given an engine overhaul manual, the learner will determine without error, all acceptable cleaning agents for each engine part.

c. Allen, National Study, Phase III, General Curriculum, "Cleaning and Corrosion Control."

d. Acme, General Mechanic.

e. Acme, Practical Test, General Test Subjects.

f. FAA, AC65-20, General Written Test Guide.

TASK

GA-25 Performing aircraft cleaning and corrosion control (Level 3)

PERFORMANCE OBJECTIVE

Perform aircraft cleaning and corrosion control.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Corrosion control
b. Forms of corrosion
c. Factors affecting corrosion
d. Inspection and preventative maintenance for corrosion
e. Corrosion of different aircraft metals
f. Corrosion-prone areas
g. Corrosion removal
h. Corrosion control and protection

Provide Demonstration On:

a. Identifying corrosion on different metals
b. Methods for removing and preventing corrosion
c. Methods of cleaning aircraft exterior

Provide Practical Application On:

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Basic Science

A/Vs:

Aviation Maintenance Publishers, "Aircraft Corrosion Control," filmstrip EA-CC

Tools and Equipment:

a. Live aircraft
b. Assorted cleaning agents
c. Assorted samples of corrosion
d. Assorted approved tools and compound for removing corrosion
e. Assorted corrosion preventative compounds

LAB HOURS 18

CLASS HOURS 8

EVALUATION (GA-25)

a. Given a live aircraft, the learner will select the proper cleaning agents and clean the aircraft exterior. This will include, in addition to the skin of the aircraft, the engine, tires and plastic. Selection and procedures will be in accordance with reference information.

b. Given two samples of corrosion, the learner will identify and remove it and apply an approved protective coating. Removal of corrosion shall not involve unnecessary removal of solid metal. Selection of removal method must be in accordance with reference information.

c. Allen, National Study, Phase III, General Curriculum, "Cleaning and Corrosion Control."

d. Acme, General Mechanic.

e. Acme, Practical Test, General Test Subjects.

f. FAA, AC65-20, General Written Test Guide.

TASK

GA-26 Identifying and selecting fuels (Level 2)

PERFORMANCE OBJECTIVE

Identify and select aviation grade fuels.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Fuels for piston engine aircraft
b. Fuel for turbine engine aircraft (JP fuels)
c. Color coding
d. Octane ratings
e. Anti-knocks compounds
f. Vapor lock
g. Detonation
h. Volatility
i. Viscosity
j. Flameout

Provide Demonstration On:

a. Color coding of fuel
b. Fuel requirements for aircraft type

Provide Practical Application On:

a. Identifying aircraft fuels (Level 2)
b. Selecting proper aircraft fuel (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC20-92: Anti-Icing Additives to Reduce Icing Problems in Aviation Gasoline

Tools and Equipment:

a. Assorted fuel samples
b. Aircraft maintenance manuals

LAB HOURS 1½

CLASS HOURS 2½

EVALUATION (GA-26)

a. Given three samples of aircraft fuels, the learner will identify each by matching color and octane rating. One hundred percent accuracy is required.

b. Given an aircraft maintenance manual, the learner will identify, without error, the proper fuel required and available alternates.

c. Allen, National Study, Phase III, General Curriculum, "Ground Operation and Servicing."

d. Acme, General Mechanic.

e. Acme, Practical Test, General Test Subjects.

f. FAA, AC65-20, General Written Test Guide.

TASK

GA-27 Starting, ground operating, moving, servicing and securing aircraft (Level 2)

PERFORMANCE OBJECTIVE

Start, ground operate, move, service and secure aircraft.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Starting, operating and shutting down piston and jet powerplants
b. Ground support equipment
c. Servicing and handling equipment
d. Securing aircraft (tie down)
e. Movement of aircraft
f. Line safety
g. What to do in case of spillage or fire

Provide Demonstration On:

a. Engine operation
b. Taxing aircraft
c. Servicing procedures
d. Tie-down of aircraft for atmospheric conditions
e. Personal safety around operating aircraft

Provide Practical Application On:

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC00-34A: Aircraft Ground Handling and Servicing
c. FAA, AC20-43C: Aircraft Fuel Control
d. McGraw-Hill, Aircraft Basic Science

A/Vs:

(Continued on back)

Tools and Equipment:

a. Live aircraft
b. Aircraft fueling equipment
c. Manufacturer's maintenance manuals
d. Hydraulic power unit
e. Electrical power unit
f. Various tie-down equipment

LAB HOURS 18

CLASS HOURS 8

EVALUATION (GA-27)

a. Given a live aircraft, fueling equipment and manual, the learner will demonstrate the proper techniques of preparing to fuel an aircraft and the fueling process with emphasis placed on grounding and in accordance with manual specifications.

b. Given an operational engine, the learner will prepare the engine for operation (pre-flight inspection), start it and run it making all function checks to determine engine and compound airworthiness. Operation will be in accordance with manufacturer's instructions and will be without error.

c. Given an aircraft engine, the learner will demonsrate the method of securing an induction fire. The learner will additionally be responsible for selection of the proper fire extinguisher and for safety procedures. All will be done without error and in accordance with procedures provided.

d. Given a live aircraft and a hydraulic and electrical external power unit, the learner will demonstrate the proper sequence and procedure of connecting operation and disconnecting of both units. Connections and operation must conform to written specifications.

e. Given an operating and moving aircraft, the learner will demonsrate the proper techniques of directing an aircraft by reference to hand signals. Signals must be sharp, clear and understandable. Response to changing conditions must be immediate.

f. Given a live aircraft, the learner will demonstrate the proper methods of tying an aircraft down with respect to normal and severe weather conditions. Tie down must be in accordance with written specifications.

g. Allen, National Study, Phase III, General Curriculum, "Ground Operation and Servicing."

h. Acme, General Mechanic.

i. Acme, Practical Test, General Test Subjects.

j. FAA, AC65-20, General Written Test Guide.

Task GA-27

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

a. Proper use of fueling and lubrication of aircraft (Level 2)
b. Starting, operating and shutting down aircraft engine (Level 2)
c. Reacting to induction fire (Level 2)
d. Connecting and operating an external hydraulic and electrical power source (Level 2)
e. Directing the movement of an aircraft (Level 2)
f. Preparing an aircraft for outside storage (Level 2)

INSTRUCTIONAL MATERIALS

A/Vs:

Aviation Maintenance Publishers, "Flight Line Safety and Aircraft Ground Handling," video tape ITP-G-138; "Aircraft Fueling," video tape ITP-G-139

TASK

GA-28 Selecting and using FAA and manufacturer's aircraft maintenance specifications, data sheets, manuals, publications and related Federal Aviation Regulations (Level 3)

PERFORMANCE OBJECTIVE

Select and use FAA and manufacturer's aircraft maintenance specifications, data sheets, manuals, publications and related Federal Aviation Regulations.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Federal Aviation Regulations (FAR)
b. Type certificate and data sheets
c. Airworthiness Directives (AD)
d. Advisory Circulars (AC)
e. Manufacturer's manuals and service bulletins
f. Supplemental Type Certificates (STC)
g. Technical Standard Orders (TSO)

Provide Demonstration On:

Locating regulatory, non-regulatory and manufacturer's information

Provide Practical Application On:

Locating information and data from:

a. Type certificate and data sheets (Level 3)
b. Federal Aviation Regulations (Level 3)
c. Airworthiness Directives (Level 3)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. Aviation Maintenance Publishers, Federal Aviation Regulations Handbook for Aviation Mechanics, EA-FAR-IC
d. McGraw-Hill, Aircraft Basic Science

Tools and Equipment:

a. Aircraft type certificate and data sheets (AC21-15A)
b. Engine and propeller type certificate and data sheets (AC33-2A)
c. Airworthiness Directives (AC39-66)
   1. Vol. I
   2. Vol. II

(Continued on back)

LAB HOURS 6½

CLASS HOURS 6½

EVALUATION (GA-28)

a. Given worksheets containing questions regarding Federal Aviation Administration data and manufacturer's data, the learner will locate the answers in the appropriate book, write a brief summary of each and list the location reference of each.

b. Allen, National Study, Phase III, General Curriculum, "Maintenance Publications."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

d. Advisory Circulars (Level 3)
e. Manufacturer's manuals and service bulletins (Level 3)
f. Supplemental Type Certificates (Level 3)

INSTRUCTIONAL MATERIALS

Tools and Equipment:

d. Various manufacturers
   1. Maintenance manuals
   2. Parts manuals
   3. Service bulletins
e. Summary of Supplemental Type Certificates (AC21-5F)
f. Maintenance records (AC43-9A)
g. TSO's (AC20-110)

TASK

GA-29 Reading technical data (Level 3)

PERFORMANCE OBJECTIVE

Read technical data from FAA and manufacturers manuals and specifications.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Standard aviation abbreviations
b. Standard aircraft definitions
c. FAA publications
d. Manufacturer's publications

Provide Demonstration On:

a. Using and understanding the Type Certificate and Data Sheets
b. Using and understanding the Airworthiness Directives
c. Using and understanding the Federal Aviation Regulations

Provide Practical Application On:

Reading, understanding and relating technical information (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. Aviation Maintenance Publishers, Federal Aviation Regulations Handbook for Aviation Mechanics, EA-FAR-IC
d. McGraw-Hill, Aircraft Basic Science

Tools and Equipment:

a. Aircraft type certificate and data sheets
b. Airworthiness Directives
   1. Vol. I
   2. Vol. II
c. Applicable Federal Aviation Regulations
d. Various manufacturer's manuals

LAB HOURS 3

CLASS HOURS 3

EVALUATION (GA-29)

a. Given the aircraft type certificate and data sheets, the airworthiness directives, a set of applicable Federal Aviation Regulations and various manufacturer's manuals, the learner will locate, determine specific data and write a summary explanation of given items without error and within time limits set by the instructor.

b. Allen, National Study, Phase III, General Curriculum, "Maintenance Publications."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

TASK

GA-30 Exercising mechanic privileges within the limitations prescribed by FAR 65 (Level 3)

PERFORMANCE OBJECTIVE

Identify the aircraft mechanics privileges within the limitations prescribed by FAR 65.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. FAR 65
b. Mechanics privileges and limitations
c. FAR 43
d. Major and minor repairs
e. Preventative maintenance
f. Alternations
g. FAR 145
h. Repair stations
i. Ethical and legal responsibility

Provide Demonstration On:

Filling out appropriate forms

Provide Practical Application On:

a. Interpreting FAR 65 (Level 3)
b. Classifying aircraft repairs (Level 1)
c. Interpreting regulations governing repairs and alterations (Level 3)
d. Interpreting repair station regulations (Level 1)
e. Recognizing mechanics legal and ethical responsibilities (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. Aviation Maintenance Publishers, Federal Aviation Regulation Handbook for Aviation Mechanics, EA-FAR-IC
c. McGraw-Hill, Aircraft Basic Science
d. Aviation Maintenance Publishers, Understanding Federal Air Regulations

Tools and Equipment:

Federal Aviation Regulations:

a. Part 43
b. Part 65
c. Part 145
d. AC65-2D

LAB HOURS 3

CLASS HOURS 2

EVALUATION (GA-30)

a. Given the Federal Aviation Regulations, Parts 43, 65 and 145, the learner will judge hypothetical cases and make a summary report including filling out the appropriate forms. Written work must be acceptable by local FAA officials.

b. Allen, National Study, Phase III, General Curriculum, "Mechanic Privileges and Limitations."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

TASK

GA-31 Writing description of aircraft condition and work performed (Level 3)

PERFORMANCE OBJECTIVE

Write description of aircraft condition and work performed and required by FAA.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Requirements for entries
b. Inspection requirements
c. Classifying repairs and alterations
d. Condition reports
e. Manufacturer's service information

Provide Demonstration On:

Basic report and description entry samples

Provide Practical Application On:

a. Inspecting an aircraft and preparing a condition report (Level 3)
b. Writing a description of major/minor repairs and routine maintenance (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. Aviation Maintenance Publishers, Federal Aviation Regulations Handbook for Aviation Mechanics, EA-FAR-IC
d. McGraw-Hill, Aircraft Basic Science

Tools and Equipment:

a. Live aircraft
b. Federal Aviation Regulation, Part 43

LAB HOURS 3

CLASS HOURS 2

EVALUATION (GA-31)

a. Given a live aircraft, the learner will inspect a specific section and upon completion will write a condition report so that it reflects the status and condition of the aircraft at time of inspection.

b. Given mock repairs and mock routine maintenance, the learner will write the appropriate description of each and will include the required data as prescribed by FAR 43.

c. Allen, National Study, Phase II, General Curriculum, "Maintenance Forms and Records."

d. Acme, General Mechanic.

e. Acme, Practical Test, General Test Subjects.

f. FAA, AC65-20, General Written Test Guide.

TASK

GA-32 Completing required maintenance forms, records and inspection reports (Level 3)

PERFORMANCE OBJECTIVE

Complete required maintenance forms, records and inspection reports.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. FAA Form 8010-4
b. FAA Form 337
c. FAA Form 8330-2
d. Permanent aircraft records
e. Log book entries
f. FAR 43 and 91
g. Inspection checklist
h. Dating records
i. 100 hour inspection (annual)
j. ACA Form 2350
k. Required records

Provide Demonstration On:

a. Sample entries
   1. Log book
   2. FAA Form 337
   3. FAA Form 8330-2
   4. Airworthiness Directive log entry
   5. Weight and balance
b. Practical use of Federal Aviation Regulations
c. ACA Form 2350

Provide Practical Application On:

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. Aviation Maintenance Publishers, Federal Aviation Regulations Handbook for Aviation Mechanics, EA-FAR-IC
d. McGraw-Hill, Aircraft Basic Science

Tools and Equipment:

a. Forms, FAA-337, FAA-8330-2, ACA 2350 and 8010-4
b. Sample log books
c. Inspection checklist
d. FAR Part 43
e. FAR Part 91

(Continued on back)

LAB HOURS 2

CLASS HOURS 6½

EVALUATION (GA-32)

a. Given mock aircraft major and minor repairs and/or alterations, the learner will prepare a log book and FAA-337 to conform to FAA standards.

b. Given an inspection checklist, the learner will demonstrate its proper use. All entries made must be the same as known conditions.

c. Given sample maintenance entries, the learner will determine if the given information is sufficient for compliance with the applicable FARs. If insufficient data is given, the learner will relate the necessary information needed for completion. This will be done without error.

d. Allen, National Study, Phase III, General Curriculum, "Maintenance Forms and Records."

e. Acme, General Mechanic.

f. Acme, Practical Test, General Test Subjects.

g. FAA, AC65-20, General Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

a. Recording maintenance entries (Level 3)
b. Using inspection guides (Level 3)
c. Evaluating aircraft records for compliance with Federal Air Regulations (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

e. Aviation Maintenance Publishers, Aircraft Inspection and Maintenance Records

A/Vs:

Aviation Maintenance Publishers, "Inspection and Maintenance Records," filmstrip EA-IAR

TASK

GA-33 Weighing aircraft

PERFORMANCE OBJECTIVE

Weigh an aircraft and compute empty, forward and aft loaded center of gravity.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Theory of weight and balance
b. Mathematical proof
c. Weight and balance data
d. Terminology (moment, arms, etc.)
e. Aircraft weighing procedure
f. Weight and balance records
g. Reading scales and recording data

Provide Demonstration On:

a. Zeroing scales
b. Preparing an aircraft for weighing
c. Placing the aircraft on scales and removing it from scales
d. Leveling aircraft on the scales
e. Making instruments

Provide Practical Application On:

Locating, interpreting and applying weight and balance information (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Basic Science
d. Aviation Maintenance Publishers, Aircraft Weight and Balance

Tools and Equipment:

a. Live aircraft
b. Scales (3 ea)
c. Spirits level
d. Assorted hand tools
e. Plum bob
f. Aircraft type certificate and data sheets
g. Assorted tare
h. Jacks

A/Vs:

(Continued on back)

LAB HOURS 4½

CLASS HOURS 8½

EVALUATION (GA-33)

a. Given a live aircraft and the necessary weight and balance implements, the learner will locate all reference data, weigh the aircraft and perform all precision measurements. The computed empty center of gravity will be accurate to 1/10".

b. Allen, National Study, Phase III, General Curriculum, "Aircraft Weight and Balance."

c. Acme, General Mechanic.

d. Acme, Practical Test, General Test Subjects.

e. FAA, AC65-20, General Written Test Guide.

INSTRUCTIONAL MATERIALS

A/Vs:

a. Aviation Maintenance Publishers, "Aircraft Weight and Balance," filmstrip EA-BAL
b. Aviation Maintenance Publishers, "Importance and Principles of Aircraft Weight and Balance," video tape ITP-G-123

TASK

GA-34 Performing complete weight and balance check and recording data (Level 3)

PERFORMANCE OBJECTIVE

Perform complete weight and balance check and record the data.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Weight and balance computation for airplanes and helicopters
b. Weight and balance extreme conditions
c. Installation of ballast
d. Loading graphs and C.G. envelopes
e. Recording weight and balance
f. Datum, moment and center of gravity

Provide Demonstration On:

a. Computing a complete weight and balance and recording the same for airplane and helicopter
b. Computing new center of gravity and useful load after changes in equipment
c. Installation of ballast computation
d. Making a loading schedule

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Basic Science
d. Aviation Maintenance Publishers, Aircraft Weight and Balance

A/Vs:

Aviation Maintenance Publishers, "Center of Gravity and Loading Computations," video tape ITP-G-124; "Aircraft Weight and Balance," filmstrip EA-BAL

Tools and Equipment:

Aircraft type certificate and data sheets

LAB HOURS 15

CLASS HOURS 12

EVALUATION (GA-34)

a. Given a set of weights and measurements for a specific aircraft, the learner will compute the complete weight and balance (empty C.G., fore and aft C.G. and useful load) and record it in a format as shown in A.C. 43.13-1A. Computations must be within 5% of known values.

b. Using the computed values, the learner will be given weights and arms of equipment items to be both added and removed and will compute the new empty center of gravity and loading schedules to within 1/10".

c. Given a set of weights and measurements for a specific helicopter, the learner will compute the required weight and balance to within 5% of known values.

d. Allen, National Study, Phase III, General Curriculum, "Aircraft Weight and Balance."

e. Acme, General Mechanic.

f. Acme, Practical Test, General Test Subjects.

g. FAA, AC65-20, General Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

a. Solving weight and balance problems (Level 3)
b. Computing fore and aft center of gravity (Level 3)
c. Computing effect of equipment changes and loading schedules (Level 3)
d. Computing weight and balance for helicopter (Level 3)
e. Examining weight and balance records (Level 2)

TASK

AF-01 Identifying wood defects (Level 2)

PERFORMANCE OBJECTIVE

Identify aircraft wood defects.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Wooden aircraft structures
b. Aircraft wood requirements
c. Identification of wood defects

Provide Demonstration On:

a. Wood grain deviation
b. Failure of defective wood

Provide Practical Application On:

Identifying defects in wood samples (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

Various aircraft wood samples

LAB HOURS 1

CLASS HOURS 1

EVALUATION (AF-01)

a. Given AC43.13-1A and ten samples of wood, five of which have defects, the learner will identify each defect and select thoses samples of wood that would be acceptable for use in aircraft structures. All defects must be identified and reference specifications interpreted without error.

b. Allen, National Study, Phase III, Airframe Curriculum, "Wood Structures."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-02 Inspecting wood structures (Level 2)

PERFORMANCE OBJECTIVE

Inspect aircraft wooden structures.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Types of approved woods
b. Effects of atmospheric condition of wood structures
c. Inspection of wooden structures

Provide Demonstration On:

Inspection requirements and procedures of wood structures

Provide Practical Application On:

a. Identifying kinds of woods acceptable for aircraft (Level 2)
b. Illustrating the effects of shrinkage of wood (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

Various wood samples

LAB HOURS 1½

CLASS HOURS 1½

EVALUATION (AF-02)

a. Given AC43.13-1A and four different types of wood samples, the learner will identify their usefulness in aircraft wood structures. An illustration of the effects of shrinkage of the wood samples will be given. The identification of the illustration and interpretation of information from AC43.13-1A should be without error.

b. Allen, National Study, Phase III, Airframe Curriculum, "Wood Structures."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-03 Servicing and repairing wood structures (Level 1)

PERFORMANCE OBJECTIVE

Service and repair aircraft wood structures.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Service and repair of wooden structures
b. Glues and gluing techniques
c. Spliced joints
d. Plywood skin repair
e. Spar and rib repair
f. Bolt and bushing hole repair
g. Wood finishes
h. Substitute woods

Provide Demonstration On:

Use of AC43.13-1A for identifying approved materials and repairs for aircraft wooden structures

Provide Practical Application On:

a. Judging the suitability of substitute materials (Level 1)
b. Describing the kinds of glues and gluing techniques (Level 1)
c. Reading drawings pertaining to repair of wood structures (Level 1)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. The list supplied in the evaluation
b. AC43.13-1A

LAB HOURS	0
CLASS HOURS	4½

EVALUATION (AF-03)

a. Given AC43.13-1A, materials that may be substituted for aircraft spruce, types of approved aircraft glue and gluing techniques and dimensions for spar splice, rib splice and scarf plywood repair, method for repairing elongated bolt holes and approved wood finishes, the learner will select the correct manual and locate the appropriate information and write a brief summary for each. The learner must select and use materials and wood that meet or exceed written specifications. Interpretation of AC43.13-1A must be without error.

b. Allen, National Study, Phase III, Airframe Curriculum, "Wood Structures."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

d. Repairing elongated bolt holes (Level 1)
e. Identifying protective finishes (Level 1)

TASK

AF-04 Selecting and applying fabric and fiberglass (Level 1)

PERFORMANCE OBJECTIVE

Select and apply fabric and fiberglass covering materials.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Aircraft fabrics
b. Seams (sewed and doped)
c. Applying covering
d. Covering wings and fuselages
e. Ventilate, drain and inspect openings
f. Heat shrink fabrics

Provide Demonstration On:

a. FAA approved fabric identification
b. Approved methods of applying fabric

Provide Practical Application On:

Identifying fabrics and seams and describing methods of applying fabric (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Maintenance and Repair
d. Aviation Maintenance Publishers, Aircraft Fabric Covering

Tools and Equipment:

a. AC43.13-1A
b. Fabric samples
c. Fiberglass materials
d. Fabric dope
e. Heat gun

LAB HOURS 5

CLASS HOURS 3½

EVALUATION (AF-04)

a. Given AC43.13-1A, specifications and samples of fabric, the learner will identify appropriate fabric coverings and describe methods of applying the fabric. Descriptions must comply with AC43.13-1A and given specifications.

b. Allen, National Study, Phase III, Airframe Curriculum, "Fabric Covering."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-05 Inspecting, testing and repairing fabric and fiberglass (Level 3)

PERFORMANCE OBJECTIVE

Inspect, test and repair aircraft fabric and fiberglass.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Repair of fabric covers
b. Replacing panels in wing covers
c. Causes of fabric deterioration
d. Checking condition of doped fabric
e. Testing fabric covering
f. Strength criteria for aircraft fabric
g. Using Maule or Seyboth fabric tester

Provide Demonstration On:

a. Fabric repair techniques
b. Check and test aircraft fabric covering.

Provide Practical Application On:

Inspecting, testing and repairing fabric cover (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Maintenance and Repair
d. Aviation Maintenance Publishers, Aircraft Fabric Covering

Tools and Equipment:

a. Live aircraft
b. Fabric tester
c. Assorted fabric tools
d. Assorted aircraft dopes and thinner
e. Aircraft fabric
f. Sewing thread
g. Sewing machine
h. Airfoils or mock airfoils
i. Aircraft type certificate and data sheet

LAB HOURS 9

CLASS HOURS 4

EVALUATION (AF-05)

a. Given a live aircraft, the learner will demonstrate the proper method of inspecting the entire fabric covering and will test the same by an approved method for determination of airworthiness. Determinations must equal known conditions.

b. Given either a live aircraft airfoil or a mock airfoil, the learner will prepare a covering by sewing fabric. It is to be installed and completely finished in accordance with AC-43.13-1A.

c. Given a finished fabric surface, the learner will repair two holes in accordance with approved data. One hole will be repaired by a sewn patch and the other by the "lap and dope" method. Both repairs will meet specifications in AC43.13-1A.

d. Allen, National Study, Phase III, Airframe Curriculum, "Frame Covering."

e. Acme, Airframe Mechanic.

f. Acme, Practical Test, Airframe Test Subjects.

g. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-06 Applying trim, letters and touch-up paint (Level 1)

PERFORMANCE OBJECTIVE

Apply trim, letters and touch-up paint.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Identification and registration marking specifications
b. Painting trim and identification numbers
c. Paint touch-up
d. Applying decals

Provide Demonstration On:

a. Location and size of registration markings
b. Locating and determining manufacturer's trim numbers

Provide Practical Application On:

Drawing registration numbers and describing the application of trim designs (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Airframe Maintenance and Repair
c. Aviation Maintenance Publishers, Aircraft Painting and Finishing

Tools and Equipment:

a. Federal aviation regulation
b. Straight edge
c. Masking tape
d. Live aircraft
e. Aircraft parts manual

LAB HOURS 0

CLASS HOURS 2

EVALUATION (AF-06)

a. Given an aircraft and FAR Part 45, the learner will determine the registration number, physical size requirement and the location requirement for display. The learner will then draw the entire registration number and mask it for painting. Height, width, stroke and spacing will conform to specifications.

b. Given a late model aircraft and its approved parts manual, the learner will determine the original paint colors and part numbers without error.

c. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Finishes."

d. Acme, Airframe Mechanic.

e. Acme, Practical Test, Airframe Test Subjects.

f. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-07 Identifying and selecting aircraft finishing materials (Level 2)

PERFORMANCE OBJECTIVE

Identify and select aircraft finishing materials.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Finishing materials
b. Identification of paint finishes
c. Compatibility of paints
d. Dope
e. Rejuvenator
f. Lacquers and enamels

Provide Demonstration On:

a.. Matching paint with different metals and fabrics
b. Matching dope types with fabrics

Provide Practical Application On:

Identifying finishing materials and thinners for specific applications (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair
c. Aviation Maintenance Publishers, Aircraft Painting and Finishing

A/Vs:

Aviation Maintenance Publishers, "Aircraft Painting," filmstrip EA-AP

Tools and Equipment:

a. Aircraft manufacturer's maintenance manuals
b. Assorted paint manufacturer's technical manuals
c. Assorted pre-painted panels
d. Test fluid (test for paint type)

LAB HOURS 1

CLASS HOURS 2

EVALUATION (AF-07)

a. Given 3 types of metal examples and a fabric example, the learner will select the possible primers (if applicable), paints, dopes (if applicable) and thinners that are approved for each.

b. Given a finished painted and a finished doped surface, the learner will, by test, determine without error, the type of finish present.

c. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Finishes."

d. Acme, Airframe Mechanic.

e. Acme, Practical Test, Airframe Test Subjects.

f. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-08 Applying paint and dope (Level 2)

PERFORMANCE OBJECTIVE

Apply paint and dope on an appropriate surface.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Restoration of paint finishes
b. Nitrocellulose and acrylic nitrocellulose lacquer finishes
c. Epoxy finishes
d. Florescent finishes
e. Enamel finishes
f. Preparation and application of paint
g. Dopes and doping
h. Temperature and humidity effects on doping
i. Using the spray gun
j. Cleaning and etching aluminum

Provide Demonstration On:

a. Setting up spraying equipment for paints and dopes
b. Techniques for spraying paint and dope
c. Techniques for brushing on dope

Provide Practical Application On:

a. Applying dope by brush (Level 2)
b. Spraying primers, paints and dopes (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair
c. Aviation Maintenance Publishers, Aircraft Painting and Finishing

A/Vs:

(Continued on back)

Tools and Equipment:

a. Surfaces to be painted
   1. Metal
   2. Fabric
b. Paints, dopes, primers and thinners
c. Spraying equipment
d. Breathing safety equipment
e. Paint brushes
f. Paint manufacturer's instruction manuals
g. Dope manufacturer's instruction manuals

LAB HOURS 18

CLASS HOURS 4

EVALUATION (AF-08)

a. Given a live metal aircraft or simulation, the learner will prime and paint upper, lower and vertical surfaces, demonstrating proper adjustment of equipment as well as proper spraying techniques. All work must meet return-to-flight service specifications.

b. Using fabric covered structure, covering and finishing materials and a procedure sheet or written instructions, the learner will apply dope by brush and spray application. Surface tapes, drain grommets and reinforcing patches will be applied as a part of the doping procedure.

c. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Finishes."

d. Acme, Airframe Mechanic.

e. Acme, Practical Test, Airframe Test Subjects.

f. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL MATERIALS

A/Vs:

Aviation Maintenance Publisher, "Aircraft Painting Tips," filmstrip EA-APT

TASK

AF-09 Inspecting finishes and identifying defects (Level 2)

PERFORMANCE OBJECTIVE

Inspect aircraft finishes and identify defects.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Common paint troubles
b. Common troubles in dope application
c. Orange peel
d. Runs, sags
e. Laps, streaks
f. Blisters, pin holes
g. Blushing
h. Peeling and flaking

Provide Demonstration On:

Inspection techniques on aircraft finishes

Provide Practical Application On:

Inspecting finishes and recognizing defects (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair
c. Aviation Maintenance Publishers, Aircraft Painting and Finishing

Tools and Equipment:

a. Assorted aircraft finishes of good quality
b. Samples containing defects

LAB HOURS 2

CLASS HOURS 1

EVALUATION (AF-09)

a. Given ten aircraft finish samples, five of which are defective, the learner will identify each defect and relate the apparent causes without error.

b. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Finishes."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-10 Installing conventional rivets (Level 3)

PERFORMANCE OBJECTIVE

Install conventional aircraft rivets.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Rivet layout and installation
b. Rivet failures
c. Removing rivets
d. Identifying rivets

Provide Demonstration On:

a. Proper selection and use of riveting equipment
b. Proper selection of rivets
c. Proper method of removing rivets

Provide Practical Application On:

a. Identifying conventional aircraft rivets (Level 3)
b. Performing riveting to FFA specifications (Level 3)
c. Identifying, removing and replacing improperly installed rivets (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair
c. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
d. Aviation Maintenance Publishers, Aircraft Sheet Metal Construction and Repair

Tools and Equipment:

a. Riveting equipment
b. Aluminum sheet
c. Rivets
   1. Non-counter sink type
   2. Counter sink type
d. Drill motor and bits
e. Aluminum shears
f. Ruler

A/Vs:

(Continued on back)

LAB HOURS 16

CLASS HOURS 5

EVALUATION (AF-10)

a. Given sheet aluminum, the learner will prepare two identical pieces 6" x 6" for riveting together. He/she will select the proper (non-counter sink type) rivet size and length. Using the appropriate reference, the learner will compute rivet spacing and edge distance. The rivets will then be driven correctly with the proper equipment. Half of the rivets will be removed in accordance with normal procedures and the holes counter sunk to accept counter sunk rivets. The learner will select the appropriate rivets and install them. All work must meet specifications outlined in AC43.13-1A.

b. Allen, National Study, Phase III, Airframe Curriculum, "Sheet Metal Structures."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL MATERIALS

A/Vs:

Aviation Maintenance Publishers, "Rivet Identification," video tape ITP-S-113

TASK

AF-11 Installing special rivets and fasteners (Level 2)

PERFORMANCE OBJECTIVE

Install special aircraft rivets and fasteners.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Self plugging rivets
   1. Friction lock
   2. Mechanical lock
b. Pull-thru rivets
c. Riv-nut
d. Dill Lok-Skrus and Lok-Rivets
e. High shear and heat treated rivets
f. Dzus fasteners

Provide Demonstration On:

a. The assorted uses of special rivets and fasteners
b. The methods of installing special rivets and fasteners

Provide Practical Application On:

a. Identifying and selecting aircraft fasteners and rivets (Level 2)
b. Determining acceptable hole and installing high shear, blind rivets and de-icer-boot fasteners (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Maintenance and Repair
d. Aviation Maintenance Publishers, Aircraft Sheet Metal Construction and Repair

Tools and Equipment:

a. 6" x 6" aluminum sheets
b. Assorted special rivets and fasteners
c. Special tools

LAB HOURS 10

CLASS HOURS 5

EVALUATION (AF-11)

a. Given a 6" x 6" aluminum sheet, written specifications and three mechanical lock blind rivets, three friction lock blind rivets, two riv-nuts, three high shear rivets and two Dzus fasteners, the learner will drill holes and install rivets and fasteners. The learner will then remove each of the rivets and fasteners. All work must meet FAA specifications.

b. Allen, National Study, Phase III, Airframe Curriculum, "Sheet Metal Structures."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-12 Hand forming, laying out and bending sheet metal (Level 3)

PERFORMANCE OBJECTIVE

Hand form, layout and bend aircraft sheet metal.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Special tools and devices for sheet metal
b. Metal/working machine
c. Forming machines, operations and terms
d. Making straight line bends
e. Setback
f. Making layouts
g. Hand forming

Provide Demonstration On:

a. Operation procedures of metal working tools and machines
b. Precision layout and bending processes
c. Hand forming operations

Provide Practical Application On:

a. Making a joggle in an aluminum sheet (Level 2)
b. Preparing a layout for a bend in aircraft sheet metal (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Maintenance and Repair
d. Aviation Maintenance Publishers, Aircraft Sheet Metal Construction and Repair

Tools and Equipment:

a. Various aluminum sheeting
b. Straight edge ruler
c. Metal bending and shearing equipment
d. Oak wood blocks
e. Various hand tools

LAB HOURS 27

CLASS HOURS 7

EVALUATION (AF-12)

a. Given a 6" x 8" aluminum sheet and dimensions, the learner will layout and form a joggle. Finished work must be within .010 inch of specifications.

b. Given the dimensions of an aluminum channel, the learner will prepare the layout, cut the metal to size and make the necessary bends to completely form the channel. Finished work must be within .030 inch of specifications.

c. Given a print of a streamlined fitting, dimensions, the necessary soft aluminum sheet and a wood block, the learner will shape the wood block to the correct dimensions and hand form the fitting by "bumping". Finished work must be within .030 inch of specifications.

d. Allen, National Study, Phase III, Airframe Curriculum, "Sheet Metal Structures."

e. Acme, Airframe Mechanic.

f. Acme, Practical Test, Airframe Test Subjects.

g. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

c. Laying out and making bends in sheet metal (Level 3)
d. Forming aluminum parts by bumping (Level 3)

TASK

AF-13 Inspecting and repairing sheet metal structures (Level 3)

PERFORMANCE OBJECTIVE

Inspect and repair sheet metal aircraft structures.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. General structural repairs
b. Inspection of damage
c. Classification of damage
d. Stresses in structural members
e. Specific repair types
f. Structural sealing
g. Twist drills and countersinks
h. Files
i. Burnishing scratches
j. Dissimilar metals corrosion

Provide Demonstration On:

Basic techniques of structural sheet metal repairs

Provide Practical Application On:

a. Selecting and using twist drills and countersinks (Level 3)
b. Selecting and using hand files for soft metals (Level 3)
c. Repairing shallow scratches in sheet metal (Level 2)
d. Repairing a slightly oversized hole by reaming for next larger size rivet (Level 3)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Maintenance and Repair
d. Aviation Maintenance Publishers, Aircraft Sheet Metal Construction and Repair

Tools and Equipment:

a. Sheet metal tools
b. Hand tools
c. Sheet metal and rivets
d. Samples of structural damage
e. Joint compound
f. Drill motor and twist drills

LAB HOURS 29

CLASS HOURS 15

EVALUATION (AF-13)

a. Given a damaged aircraft stressed skin section, the learner will remove the damaged area and fabricate a flush patch for insertion. Countersink type rivets will be selected and used for the repair. The repair will be made watertight. All work must meet AC43.13-A specifications.

b. Given a cracked aluminum member at a riveted joint, the learner will remove the applicable rivets and repair the crack. After the repair is made, the original rivets will be installed to the first oversize. All work must meet AC43.13-1A specifications.

c. Given three samples of structural members that have been overloaded and failed, the learner will describe the nature of each failure with respect to the load.

d. Given two different kinds of metal, the learner will prepare them for joining to prevent dissimilar metal corrosion. All work must meet AC43.13-1A specifications.

e. Allen, National Study, Phase III, Airframe Curriculum, "Sheet Metal Structures."

f. Acme, Airframe Mechanic.

g. Acme, Practical Test, Airframe Test Subjects.

h. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

e. Preparing dissimilar metals for assembly (Level 2)
f. Describing loads in fuselage and wing structures and types of overload failure (Level 1)
g. Making minor repairs to stressed-skin-wings (Level 2)
h. Repairing aircraft structural units built from sheet metal (Level 2)
i. Determining conditions of stressed skin structure which have been critically loaded (Level 2)
j. Constructing a watertight joint (Level 2)

TASK

AF-14 Inspecting bonded structures (Level 2)

PERFORMANCE OBJECTIVE

Inspect aircraft bonded structures.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Metal bonded honeycomb
b. Honeycomb construction features
c. Sandwich structures
d. Inspection procedures
e. Repair procedures
f. Characteristics of a good repair
g. Safety precautions

Provide Demonstration On:

Inspection techniques of bonded structures

Provide Practical Application On:

a. Inspecting and repairing metal sandwich structures (Level 1)
b. Evaluating damage to bonded structures and determining type of repair needed (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC-65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. Aviation Maintenance Publishers, Aircraft Bonded Structure
d. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Various defective samples of honeycomb bonded structures
b. Manufacturer's maintenance manuals
c. AC43.13-1A

LAB HOURS 5

CLASS HOURS 4

EVALUATION (AF-14)

a. Given a defective sample of honeycomb bonded structure material, the learner will inspect it, locate the possible repair procedures and decide upon the appropriate repair means for the sample in question.

b. Allen, National Study, Phase III, Airframe Curriculum, "Sheet Metal Structures."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-15 Inspecting and repairing plastics, honeycomb and laminated structures (Level 2)

PERFORMANCE OBJECTIVE

Inspect and repair plastics, honeycomb and laminated aircraft structures.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Repairing honeycomb
b. Plastics (acrylic and cellulose)
c. Fiberglass components (mounted and laminated)

Provide Demonstration On:

a. Repair procedures on honeycomb
b. Techniques of repairing fiberglass
c. Repair procedures on plastics

Provide Practical Application On:

a. Identifying and repairing plastic fiber and fiberglass aircraft materials (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. Aviation Maintenance Publishers, Aircraft Bonded Structure
d. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Sample components made of plastic, fiber and fiberglass
b. Honeycomb repair materials
c. Honeycomb repair tools
d. Fiberglass components
e. Fiberglass repair kit
f. AC43.13-1A
g. Manufacturer's maintenance manuals

LAB HOURS 8

CLASS HOURS 3

EVALUATION (AF-15)

a. Given a sample of aircraft plastic, fiber and fiberglass, the learner will identify each and describe the approved repairing method of each without error.

b. Given a damaged section of honeycomb structure, the learner will repair the section in accordance with AC43.13-1A.

c. Given a damaged fiberglass aircraft component, the learner will repair the piece in accordance with approved data.

d. Allen, National Study, Phase III, Airframe Curriculum, "Sheet Metal Structures."

e. Acme, Airframe Mechanic.

f. Acme, Practical Test, Airframe Test Subjects.

g. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

b. Repairing damaged areas in honeycomb aircraft structures (Level 2)
c. Repairing damaged areas in fiberglass aircraft structures (Level 2)

TASK

AF-16 Inspecting, checking, servicing and repairing windows, doors and interior furnishings (Level 2)

PERFORMANCE OBJECTIVE

Inspect, check, service and repair windows, doors and interior aircraft furnishings.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Transparent plastic
   1. Cleaning
   2. Repair
   3. Removing and replacing
   4. Inspection
b. Doors and seals
c. Seat and safety belts

Provide Demonstration On:

a. Handling transparent plastic
b. Inspection techniques of doors, seats and safety belts

Provide Practical Application On:

a. Recognizing distinguishing characteristics of transparent plastic and plate glass enclosures (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Various defective plexiglass samples
b. Live aircraft
c. Aircraft maintenance manuals
d. Airworthiness directives

LAB HOURS 9

CLASS HOURS 3

EVALUATION (AF-16)

a. Given 3 samples of defective plexiglass, the learner will recognize each defect, relate its probable cause and the best way to solve the related problem. The task must be completed without error.

b. Given an aircraft plexiglass enclosure, the learner will locate and relate the recommended procedures of cleaning, repairing and protecting the plexiglass structures. The task must be completed without error.

c. Given a live aircraft, the learner will inspect and check the pressure seal doors and windows, seat recline mechanisms and safety belt installations for conformity to manufacturer's instructions and FAA directives.

d. Allen, National Study, Phase III, Airframe Curriculum, "Sheet Metal Structures."

e. Acme, Airframe Mechanic.

f. Acme, Practical Test, Airframe Test Subjects.

g. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

b. Cleaning, protecting, repairing and securing transparent plastic aircraft enclosures (Level 2)

c. Inspecting and checking pressure seal doors and windows, seat reclining mechanisms and safety belt installations (Level 2)

TASK

AF-17 Soldering, brazing and arc welding steel (Level 2)

PERFORMANCE OBJECTIVE

Solder, braze and arc weld aircraft steel.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Oxyacetylene welding equipment
b. Welding positions
c. Welded joints
d. Expansion and contraction of metals
e. Correct forming of a weld
f. Welding different metals with oxyacetylene
g. Cutting metals with oxyacetylene
h. Electric arc welding
i. Welding procedures and techniques
j. Welding aircraft steel structures
k. Solders and fluxes
l. Inert gas welding
m. Metal preparation

Provide Demonstration On:

a. Proper set-up and adjustment of welding and soldering equipment
b. Welding techniques
c. Inspecting completed work

Provide Practical Application On:

a. Preparing material before soldering, brazing and welding (Level 1)
b. Soldering electrical connections and making lap joints (Level 2)
c. Repairing steel parts by welding (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Maintenance and Repair
d. Aviation Maintenance Publishers, Welding Guidelines

Tools and Equipment:

a. Oxyacetylene welding equipment
b. Steel welding stock
c. Soldering equipment
d. TIG welding equipment
e. Arc welding equipment

A/Vs:

(Continued on back)

LAB HOURS 25½

CLASS HOURS 7

EVALUATION (AF-17)

a. Given the proper manuals, the learner will prepare a list of all soldering, brazing and welding preparation mandates and precautions regarding aircraft welding. Eighty percent of selection must be correct.

b. Given two electrical terminals, two wires to be spliced and a 3" turnplate lap joint, the learner will select the proper soldering tools and perform the necessary soldering operation. All work must meet AC43.13-1A specifications.

c. Given sufficient, thin flat steel stock, the learner will cut 3" x 1.5" pieces and perform the following welds with oxyacetylene equipment.
   1. Butt-joint horizontal
   2. Lap-joint horizontal
   3. Fillet-joint horizontal
   4. Butt-joint vertical
   5. Fillet-joint vertical
   6. Butt-joint overhead
   7. Fillet-joint overhead

   Each weld will be without error and to a Level 2 proficiency.

d. Given sufficient flat steel stock, the learner will electrically arc weld 6" pieces and perform horizontal butt-joint and fillet-joint welds using TIG welding equipment to a Level 2 proficiency.

f. Allen, National Study, Phase III, Airframe Curriculum, "Welding."

g. Acme, Airframe Mechanic.

h. Acme, Practical Test, Airframe Test Subjects.

i. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL MATERIALS

A/Vs:

Aviation Maintenance Publishers, "Oxyacetylene Welding Series," video tape EA-WBS

TASK

AF-18 Fabricating tubular structures (Level 1)

PERFORMANCE OBJECTIVE

Fabricate tubular structures.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Tubular steel structures
b. Acceptable welds
c. Alloy steel and welding
d. Alignment of tubular members
e. Normalizing
f. Welding procedures
g. Patches and sleeves
h. Splicing tubular members

Provide Demonstration On:

Cutting, fitting and welding techniques for tube members

Provide Practical Application On:

Fabricating and welding tubular steel members (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair

(Continued on back)

A/Vs:

(Continued on back)

Tools and Equipment:

a. Oxyacetylene welding equipment
b. 4130 steel tubing stock
c. AC43.13-1A

LAB HOURS 5

CLASS HOURS 6

EVALUATION (AF-18)

a. Given sufficient 4130 steel tubing stock, the learner will fabricate and weld a cluster consisting of a 90 degree and a 45 degree member attached to a horizontal tubing member. Work must meet AC43.13-1A specifications.

b. Given sufficient 4130 tubing stock, the learner will fabricate and weld an inside sleeve repair in accordance with AC43.13-1A specifications.

c. Allen, National Study, Phase III, Airframe Curriculum, "Welding."

d. Acme, Airframe Mechanic.

e. Acme, Practical Test, Airframe Test Subjects.

f. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL MATERIALS

Textbooks:

c. Aviation Maintenance Publishers, Welding Guidelines
d. McGraw-Hill, Aircraft Maintenance and Repair

A/Vs:

Aviation Maintenance Publishers, "Oxyacetylene Welding Series," video tape EA-WBS

TASK

AF-19 Soldering stainless steel (Level 2)

PERFORMANCE OBJECTIVE

Solder stainless steel.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Silver solders and flux
b. Flux affect on the metal
c. Metal preparation

Provide Demonstration On:

Silver soldering techniques

Provide Practical Application On:

Silver soldering of stainless steel

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Oxyacetylene welding equipment
b. Silver solder
c. Flux
d. Various flat stock stainless steel

LAB HOURS 0

CLASS HOURS 1

EVALUATION (AF-19)

a. Given two 3" x 1.5" stainless steel flat stock pieces, the learner will perform a silver solder butt-joint to a Level 2 proficiency.

b. Allen, National Study, Phase III, Airframe Curriculum, "Welding."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC-65-21, Airframe Written Test Guide.

TASK

AF-20 Welding stainless steel and aluminum (Level 2)

PERFORMANCE OBJECTIVE

Weld stainless steel and aluminum.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Oxyacetylene welding of stainless steel and aluminum
b. TIG welding of stainless steel and aluminum

Provide Demonstration On:

Welding techniques for stainless steel and aluminum structural members

Provide Practical Application On:

Inspecting and welding aluminum and stainless steel (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Maintenance and Repair
d. Aviation Maintenance Publishers, Welding Guidelines

Tools and Equipment:

a. Oxyacetylene welding equipment
b. TIG welding equipment
c. Stainless steel stock
d. Aluminum stock

LAB HOURS 3

CLASS HOURS ½

EVALUATION (AF-20)

a. Given three samples of defective stainless steel welded joints, the learner will identify the defects, the relative cause of the defect and the corrective action for overcoming the defect during welding. Answers must meet AC43.13-1A specifications.

b. Given stainless steel pieces, the learner will demonstrate oxyacetylene and TIG welding procedures by performing butt-joint welds to a Level 2 proficiency.

c. Given selected aluminum stock pieces, the learner will perform butt-joint welds using TIG welding equipment to a Level 2 proficiency.

d. Allen, National Study, Phase III, Airframe Curriculum, "Welding."

e. Acme, Airframe Mechanic.

f. Acme, Practical Test, Airframe Test Subjects.

g. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-21 Welding magnesium and titanium (Level 1)

PERFORMANCE OBJECTIVE

Weld magnesium and titanium.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Magnesium characteristics
b. Titanium characteristics
c. Comparing magnesium welding to aluminum welding
d. Welding limitations
e. Comparing titanium welding to stainless steel welding

Provide Demonstration On:

Welding techniques for magnesium and titanium

Provide Practical Application On:

Welding of magnesium and titanium (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

FAA, AC65-15A: Airframe Handbook

Tools and Equipment:

a. TIG welding equipment
b. Magnesium samples
c. Titanium samples

LAB HOURS 0

CLASS HOURS 2

EVALUATION (AF-21)

a. Given samples of magnesium and titanium, the learner will select proper equipment and demonstrate techniques of running a bead on each type of metal using TIG welding equipment. Work must be to a Level 1 proficiency.

b. Allen, National Study, Phase III, Airframe Curriculum, "Welding."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-21 Welding magnesium and titanium (Level 1)

PERFORMANCE OBJECTIVE

Weld magnesium and titanium.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Magnesium characteristics
b. Titanium characteristics
c. Comparing magnesium welding to aluminum welding
d. Welding limitations
e. Comparing titanium welding to stainless steel welding

Provide Demonstration On:

Welding techniques for magnesium and titanium

Provide Practical Application On:

Welding of magnesium and titanium (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

FAA, AC65-15A: Airframe Handbook

Tools and Equipment:

a. TIG welding equipment
b. Magnesium samples
c. Titanium samples

LAB HOURS	0
CLASS HOURS	2

EVALUATION (AF-21)

a. Given samples of magnesium and titanium, the learner will select proper equipment and demonstrate techniques of running a bead on each type of metal using TIG welding equipment. Work must be to a Level 1 proficiency.

b. Allen, National Study, Phase III, Airframe Curriculum, "Welding."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-21 Welding magnesium and titanium (Level 1)

PERFORMANCE OBJECTIVE

Weld magnesium and titanium.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Magnesium characteristics
b. Titanium characteristics
c. Comparing magnesium welding to aluminum welding
d. Welding limitations
e. Comparing titanium welding to stainless steel welding

Provide Demonstration On:

Welding techniques for magnesium and titanium

Provide Practical Application On:

Welding of magnesium and titanium (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

FAA, AC65-15A: Airframe Handbook

Tools and Equipment:

a. TIG welding equipment
b. Magnesium samples
c. Titanium samples

LAB HOURS 0

CLASS HOURS 2

EVALUATION (AF-21)

a. Given samples of magnesium and titanium, the learner will select proper equipment and demonstrate techniques of running a bead on each type of metal using TIG welding equipment. Work must be to a Level 1 proficiency.

b. Allen, National Study, Phase III, Airframe Curriculum, "Welding."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-22 Rigging fixed wing aircraft (Level 2)

PERFORMANCE OBJECTIVE

Apply the principles of flight to rigging a fixed wing aircraft.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Aerodynamic principles
b. Aerodynamic efficiency related to atmospheric conditions
c. Airfoils
d. Thrust and drag
e. Axes of an aircraft
f. Stability and control
g. Control about the three axes
h. High speed and supersonic aerodynamics
i. Parts of the aircraft
   1. Fuselage
   2. Wings
   3. Empennage
   4. Landing gears

Provide Demonstration On:

a. Basic aerodynamics
b. Bernoulli's Principal
c. Aircraft controls

Provide Practical Application On:

a. Using correct aircraft nomenclature (Level 1)
b. Interpreting the theory of flight (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair

A/Vs:

a. Sanderson, "Science of Flight," filmstrip
b. FAA Film Service, "How Airplanes Fly," 16mm movie #11132

Tools and Equipment:

a. Live aircraft
b. FAA GA-20-29, "Main Parts of an Airplane" (handout)

LAB HOURS 5

CLASS HOURS 4

EVALUATION (AF-22)

a. Given a live aircraft and a handout list of all the fixed and movable aircraft surfaces and terminology, the learner will identify all listed terms and relate their aerodynamic functions. Eighty percent of the answers must be correct.

b. Allen, National Study, Phase III, Airframe Curriculum, "Assembly and Rigging."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-23 Rigging rotary wing aircraft (Level 1)

PERFORMANCE OBJECTIVE

Apply the principles of flight to rigging a rotary wing aircraft.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Forces acting on a helicopter
b. Helicopter axes of flight
c. Blade stall
d. Vibrations
e. Tracking
f. Main parts of helicopter
g. Flight controls

Provide Demonstration On:

Helicopter control operation

Provide Practical Application On:

Labeling parts and components that effect flight characteristics of the helicopter

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. Aviation Maintenance Publishers, Fundamentals of Helicopter Maintenance

Tools and Equipment:

Live helicopter

LAB HOURS 0

CLASS HOURS 8

EVALUATION (AF-23)

a. Given a live helicopter and a list of helicopter controls and key component parts, the learner will identify each and relate its basic principal of operation. Eighty percent of the answers must be correct.

b. Allen, National Study, Phase III, Airframe Curriculum, "Assembly and Rigging."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-24 Checking alignment of structures (Level 2)

PERFORMANCE OBJECTIVE

Check alignment of structures.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Fuselage alignment
b. Wing alignment
c. Control alignment
d. Numbering systems

Provide Demonstration On:

Using alignment tools and techniques

Provide Practical Application On:

Verifying alignment of airframe structures (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

FAA, AC65-15A: Airframe Handbook

Tools and Equipment:

a. Aircraft fuselage
b. Aircraft wing
c. Aircraft control surfaces
d. Manufacturer's dimensions and specifications

LAB HOURS 8

CLASS HOURS 2

EVALUATION (AF-24)

a. Given a suitable aircraft fuselage, wing and control surface and the necessary manufacturer's specifications, the learner will verify each component's alignment and relate the means commonly used to adjust misaligned sections. All references and descriptive statements must be in accordance with manufacturer's specifications.

b. Allen, National Study, Phase III, Airframe Curriculum, "Assembly and Rigging."

c. Acme. Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-25 Assembling aircraft (Level 3)

PERFORMANCE OBJECTIVE

Assemble aircraft.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Aircraft assembly and rigging
b. Helicopter assembly and rigging
c. Review of aircraft hardware
d. Safety devices
e. Bolted installations

Provide Demonstration On:

Storing, lifting, installing and rigging aircraft and helicopter major airframe members

Provide Practical Application On:

Assembling aircraft components (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. Aviation Maintenance Publishers, Aviation Maintenance Handbook and Standard Hardware Digest

Tools and Equipment:

a. Live aircraft
b. Aircraft manufacturer's assembly and maintenance manuals

LAB HOURS	6
CLASS HOURS	1

EVALUATION (AF-25)

a. Given a live aircraft, the learner will remove all control surfaces (fixed and movable) and wings and demonstrate proper handling techniques. He/she will then re-install all components in accordance with applicable manufacturer's instructions with respect to rigging and security. All work must meet AC43.13-1A specifications.

b. Allen, National Study, Phase III, Airframe Curriculum, "Assembly and Rigging."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-26 Balancing and rigging movable surfaces (Level 3)

PERFORMANCE OBJECTIVE

Balance and rig movable surfaces.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Aircraft rigging
b. Rigging checks
c. Adjustments of control surfaces
d. Helicopter rigging
e. Principles of balancing or re-balancing
f. Re-balancing procedures
g. Flight and engine control systems
h. Cable guides
i. Mechanical control linkage
j. Hydraulic operated control system
k. Types of control cable
l. Cable terminals
m. Swaged and nicropress fittings

(Continued on back)

Provide Demonstration On:

a. Rigging procedures
b. Inspecting control mechanisms

Provide Practical Application On:

a. Identifying aircraft control cable (Level 2)
b. Installing swagged cable terminals (Level 3)
c. Verifying correct control response (Level 2)
d. Installing and tension trol cable and inspect a cable control system (Level 3)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Live aircraft
b. Hand tools
c. Protractor
d. Cable swaging equipment and supplies
e. Control static balancer
f. Aircraft manufacturer's maintenance manual
g. Selection of cable types

LAB HOURS 20

CLASS HOURS 4

EVALUATION (AF-26)

a. Given a live aircraft and the appropriate tools and data, the learner will identify each control system's cable type and size, check each cable's tension and adjust to specifications. All controls will be checked for proper operation. All work must meet AC43.13-1A specifications.

b. Given a cable sample and a swaged type terminal, the learner will assemble the two together. All work must meet AC43.13-1A specifications.

c. Given a balanced type control surface, a balancing fixture and the manufacturer's balancing data, the learner will check the static balance of the surface and relate the rebalancing techniques. All work must be to manufacturer's specifications.

d. Given a live aircraft, the learner will remove a selected control cable, re-install and inspect the control system for conformity to FAA standards. All work and inspection must be within AC43.13-1A specifications.

e. Allen, National Study, Phase III, "Airframe Curriculum, "Assembly and Rigging."

f. Acme, Airframe Mechanic.

g. Acme, Practical Test, Airframe Test Subjects.

h. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

n. Control locks
o. Cable tension

Provide Practical Application On:

e. Checking static balance of a control system (Level 3)
f. Inspecting and adjusting push-pull control system (Level 3)

TASK

AF-27 Jacking aircraft (Level 3)

PERFORMANCE OBJECTIVE

Raise and lower the aircraft.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Aircraft jack points and placement
b. Aircraft jack adapters
c. Aircraft jacks
d. Need for ballast
e. Effects of air currents

Provide Demonstration On:

a. Jacking procedures
b. Safety

Provide Practical Application On:

Raising and lowering an aircraft

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Live aircraft
b. Aircraft maintenance manual
c. Aircraft jack set

LAB HOURS 2

CLASS HOURS 1

EVALUATION (AF-27)

a. Given a live aircraft, an aircraft jack set and the aircraft jacking instructions, the learner will demonstrate proper jacking techniques and precautions. Jacking must be done according to manufacturer's specifications.

b. Allen, National Study, Phase III, Airframe Curriculum, "Assembly and Rigging."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-28 Performing 100-hour or annual inspection (Level 3)

PERFORMANCE OBJECTIVE

Perform airframe conformity and airworthiness inspections.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Scope and detail of 100-hour and annual inspections
b. Type certificate conformity
c. Checklist
d. Entries
e. Airworthiness directives
f. Service bulletins

Provide Demonstration On:

Inspection sequence and techniques

Provide Practical Application On:

Performing a 100-hour or an annual inspection (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC65-15A: Airframe Handbook

A/Vs:

Aviation Maintenance Publishers, "Inspection and Maintenance Records," filmstrip EA-IAR and "Aircraft 100 Hour/Annual Inspections," filmstrip EA-HAS

Tools and Equipment:

a. Live aircraft
b. Federal aviation regulations
c. Aircraft type certificate and data sheets
d. Airworthiness directives

LAB HOURS 18

CLASS HOURS 2

EVALUATION (AF-28)

a. Given a live aircraft, all inspection data (FAA and manufacturer), the learner will perform a complete airframe 100 hour inspection in conformity to FAA standards. All discrepancies must be noted.

b. Allen, National Study, Phase III, Airframe Curriculum, "Airframe Inspection."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-29 Installing, checking and servicing airframe electrical wiring, controls, switches, indicators and protective devices (Level 3)

PERFORMANCE OBJECTIVE

Install, check and service airframe electrical components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Electrical system components
b. Installation of electrical systems
c. FAA requirements for electrical systems
d. Circuit breakers and switches
e. Wiring procedures
f. Wire size calculation
g. Wire preparation
h. Cable terminals
i. Bonding requirements
j. Quick disconnect plugs
k. Guarded switches
l. High and low tension wiring

Provide Demonstration On:

a. Using wire and circuit protector charts
b. De-rating electrical switches
c. Routing electrical wire
d. Wire preparation and splicing

Provide Practical Application On:

a. Identifying types and characteristics of aircraft fuses, circuit breakers and switches (Level 1)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC65-9A: General Handbook
c. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
d. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles

Tools and Equipment:

a. Live or mock aircraft
b. Electrical components
c. Electrical installation tools
d. Hand tools
e. AC43.13-1A
f. Multimeter

LAB HOURS 24

CLASS HOURS 18½

EVALUATION (AF-29)

a. Given a live aircraft or mock aircraft and an electrical component to install, the learner will select the wiring, switch, circuit breaker (or fuse), electrical terminals and other necessary installation parts and install them. The installation will be accomplished within manufacturer's specifications and AC43.13-1A.

b. Given a live aircraft or electrical mockup, the learner will determine the airworthiness of a quick disconnect plug without error.

c. Given two samples of electrical wire, the learner will identify the one that is high tension and the one that is low tension and relate the relative difference of the two. One hundred percent accuracy is required.

d. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Electrical Systems."

e. Acme, Airframe Mechanic.

f. Acme, Practical Test, Airframe Test Subjects.

g. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

b. Selecting and installing aircraft electrical switches and wiring (Level 3)
c. Determining installation requirements and characteristics for aircraft electrical wiring systems and junction boxes
d. Installing electrical terminals, splices and bonding jumpers (Level 3)
e. Installing aircraft electrical wiring in a conduit (Level 2)
f. Checking and connecting quick disconnect plugs

TASK

AF-30 Inspecting, checking, troubleshooting, servicing and repairing alternating current and direct current electrical systems (Level 3)

PERFORMANCE OBJECTIVE

Inspect, check, troubleshoot, service and repair alternating current (A.C.) and direct current (D.C.) electrical systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Generators
b. D.C. generators, controls and systems
c. A.C. generators, controls and systems
d. Voltage regulators
e. Equalization of multiple generators
f. Inverters
g. Constant speed drive systems
h. Annunciator panel
i. Battery bus

Provide Demonstration On:

a. Checking generator output and making adjustments
b. Parallel generators
c. Troubleshoot generators

Provide Practical Application On:

a. Identifying methods of controlling output current and voltage of compound D.C. generators (Level 2)
b. Checking, troubleshooting and repairing an aircraft dual D.C. generator electrical system (Level 3)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC65-9A: General Handbook
c. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles
d. Aviation Maintenance Publishers, D.C. Circuits

Tools and Equipment:

a. Live multi-engine aircraft or two generator mockup
b. Hand tools
c. Multimeter
d. Generator test stand and equipment
e. 208/114 A.C. system mockup
f. A.C. and D.C. generators

LAB HOURS 18½

CLASS HOURS 19½

EVALUATION (AF-30)

a. Given a multi-engine aircraft or a dual D.C. generator electrical mock-up and the necessary test equipment, the learner will determine the control means of current and voltage, troubleshoot induced problems and repair as necessary. He/she will also demonstrate the procedure of paralleling the generators. All work must be accomplished according to manufacturer's written specifications.

b. Given a D.C. output alternator electrical system, the learner will determine the method of current and voltage control and make their adjustments. Determination of the method of rectification will be made. Induced troubles will be located and repaired. Each operation will be performed according to manufacturer's specifications.

c. Given an A.C. generator and related components, the learner will identify and relate each part and its function. He/she will relate five general characteristics of an A.C. electrical system and describe two advantages over D.C. systems.

d. Allen, National Scudy, Phase III, Airframe Curriculum, "Aircraft Electrical Systems."

e. Acme, Airframe Mechanic.

f. Acme, Practical Test, Airframe Test Subjects.

g. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

c. Identifying methods of providing A.C. in aircraft having only D.C. electrical systems (Level 1)

b. Troubleshooting and repairing a D.C. electrical system supplied by an alternator (Level 3)

e. Identifying characteristics and advantages of A.C. aircraft electrical systems (Level 1)

f. Identifying components and operating elements of a 208/114 volt A.C.

TASK

AF-31 Repairing aircraft electrical system components (Level 2)

PERFORMANCE OBJECTIVE

Repair aircraft electrical system components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Electrical equipment installation
b. Anti-collision, landing and taxi lights
c. Interior and cockpit lighting
d. Maintenance and inspection of lighting systems
e. Circuit schematics
f. Solenoid switches
g. Passenger call systems

Provide Demonstration On:

Troubleshoot with a multimeter

Provide Practical Application On:

a. Determining causes and effects of switch chatter in solenoid switches and relays (Level 2)
b. Inspecting installation and checking circuits of collision and position lights (Level 2)
c. Inspecting, checking and repairing landing and taxi light installation (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC65-9A: General Handbook
c. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
d. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles

Tools and Equipment:

a. Live aircraft or electrical simulator
b. Multimeter
c. Hand tools
d. Manufacturer's maintenance and parts manuals

LAB HOURS 11½

CLASS HOURS 13

EVALUATION (AF-31)

a. Given a live aircraft or an electrical system mockup and a multimeter, the learner will inspect, check, service and repair induced problems on:
   1. Anti-collision light circuit
   2. Position light circuit
   3. Solenoid switch or relay circuit
   4. Interior light circuit
   5. Cockpit light circuit
   6. Passenger call circuit

   All work must meet AC43.13-2A or its equivalent.

b. Given specific item replacement lists, the learner will locate replacement procedures and item part numbers. At least 80% of procedures and reference numbers will be correct.

c. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Electrical Systems."

d. Acme, Airframe Mechanic.

e. Acme, Practical Test, Airframe Test Subjects.

f. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

d. Inspecting, checking, servicing and repairing aircraft interior lights (Level 2)
e. Inspecting, checking, servicing and repairing cockpit lights and lighting circuits (Level 2)
f. Inspecting and checking electrical equipment installations for integrity of mounting and connections (Level 2)
g. Inspecting, checking and repairing passenger call systems (Level 1)
h. Locating replacement procedures and part numbers for electrical component replacements (Level 2)

TASK

AF-32 Identifying and selecting hydraulic fluids (Level 3)

PERFORMANCE OBJECTIVE

Identify and select hydraulic fluids.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Hydraulic fluid characteristics
b. Types of hydraulic fluids
c. Phosphate ester base
d. Petroleum base
e. Vegetable base
f. Color, odor and specification numbers

Provide Demonstration On:

a. Use of military specification numbers
b. Color coding of hydraulic fluid

Provide Practical Application On:

Identifying and selecting hydraulic fluids (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair
c. Aviation Maintenance Publishers, Aircraft Hydraulic Systems

Tools and Equipment:

a. Aircraft manufacturer's maintenance and service manuals
b. Samples of vegetable, petroleum and ester base hydraulic fluids

LAB HOURS 1

CLASS HOURS 1

EVALUATION (AF-32)

a. Given four different aircraft maintenance and service manuals, the learner will locate information regarding the aircraft's approved hydraulic type and capacity. He/she will relate the identifying means (color and Mil-Spec number) of each type of fluid. Description and selection of fluids must be 100% accurate.

b. Allen, National Study, Phase III, Airframe Curriculum, "Hydraulic and Pneumatic Power Systems."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-33 Repairing hydraulic and pneumatic power system components (Level 2)

PERFORMANCE OBJECTIVE

Repair hydraulic and pneumatic power system components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Basic hydraulic system operation
b. Aircraft pneumatic operation
c. Pneumatic system components
d. Hydraulic system components
e. Hydraulic seals
f. Seal replacement
g. Selector valves
h. Pressure regulators
i. Accumulators
j. Air compressors

Provide Demonstration On:

a. Using seal tools
b. Removing and installing hydraulic components
c. Using pneumatic system schematic drawings

Provide Practical Application On:

a. Selecting and installing seals (Level 2)
b. Identifying, removing and installing a hydraulic selector valve (Level 2)
c. Interpreting and describing the operation of a pneumatic power system (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair
c. Aviation Maintenance Publishers, Aircraft Hydraulic Systems

A/Vs:

Aviation Maintenance Publishers, "Aircraft Pneumatic Systems," Part I, filmstrip EA-APS

Tools and Equipment:

a. Hydraulic components
b. Live aircraft hydraulic system or mockup
c. Live aircraft pneumatic system or mockup
d. Aircraft maintenance and parts manuals
e. Hand tools

LAB HOURS 8

CLASS HOURS 7

EVALUATION (AF-33)

a. Given an aircraft hydraulic component and appropriate manuals, the learner will remove an assigned seal and select and install a new replacement seal. Seal must be installed according to manufacturer's specifications and component must operate without leaks.

b. Given a live aircraft hydraulic system or a mockup, the learner will identify, remove and re-install both a hydraulic selector valve and a pressure regulator. Procedure must be in accordance with written instructions and pressure must be adjusted to given tolerances.

c. Given a live aircraft pneumatic system or a mockup, diagrams and drawings, the learner will identify the components and describe the operation of the system in accordance with technical information provided.

d. Allen, National Study, Phase III, Airframe Curriculum, "Hydraulic and Pneumatic Power Systems."

e. Acme, Airframe Mechanic.

f. Acme, Practical Test, Airframe Test Subjects.

g. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-34 Inspecting, checking, servicing, troubleshooting and repairing hydraulic and pneumatic power systems (Level 3)

PERFORMANCE OBJECTIVE

Inspect, check, service, troubleshoot and repair hydraulic and pneumatic power systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Hydraulic filters and reservoirs
b. Constant pressure and open center hydraulic systems
c. Pressure regulation
d. Actuating cylinders
e. Hydraulic valves (selector, check, relief, flap overload, sequence, cross flow, and shuttle)
f. Hand and power pressure pumps
g. Accumulators
h. Troubleshooting hydraulic systems
i. Typical pneumatic power systems

(Continued on back)

Provide Demonstration On:

a. Formulas involving force, area and pressure
b. Inspecting and servicing techniques on hydraulic systems
c. Bleeding air from hydraulic systems

Provide Practical Application On:

a. Solving problems involving force, area and pressure (Level 2)
b. Interpreting reference information pertaining to operation of a basic hydraulic system (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair
c. Aviation Maintenance Publishers, Aircraft Hydraulic Systems

A/Vs:

Aviation Maintenance Publishers, "Aircraft Pneumatic Systems," Part II, filmstrip EA-APS

Tools and Equipment:

a. Live aircraft hydraulic system or mockup
b. Manufacturer's maintenance and parts manual
c. Hand tools
d. Hydraulic valves and controls

LAB HOURS 30

CLASS HOURS 25

EVALUATION (AF-34)

a. Given ten hydraulic problems illustrating the relationship of force, area and pressure, the learner will solve at least eight of the problems correctly.

b. Given a live aircraft hydraulic system or a mockup, the learner will check, inspect, remove, install and troubleshoot induced troubles on power pumps and accumulators to conform to manufacturer's standards. One hundred percent accuracy is required.

c. Given a live aircraft hydraulic system or a mockup, the learner will inspect, check and service a hydraulically operated flap system in accordance with manufacturers procedures.

d. Given a live aircraft hydraulic system or a mockup, the learner will troubleshoot and determine the cause of low, high, or fluctuating system hydraulic pressure.

e. Given a live aircraft hydraulic system or a mockup, the learner will inspect and service the hydraulic reservoir in accordance with manufacturers instructions.

f. Given constant and variable displacement hydraulic pumps, the learner will perform a basic disassembly, explain the operations and reassemble each to manufacturer's specifications.

g. Given schematics of a constant pressure and an open center hydraulic system, the learner will compare the two and relate the differences. Reference information will be interpreted without error and correct terminology must be used.

h. Allen, National Study, Phase III, Airframe Curriculum, "Hydraulic and Pneumatic Power Systems."

i. Acme, Airframe Mechanic.

j. Acme, Practical Test, Airframe Test Subjects.

k. FAA, AC65-21, Airframe Written Test Guide.

Task AF-34

INSTRUCTIONAL ACTIVITIES

Provide Information On:

c. Comparing constant pressure and open center types of hydraulic systems (Level 2)
d. Inspecting and servicing hydraulic resevoirs (Level 3)
e. Identifying and describing the operation of constant and variable displacement hydraulic pumps (Level 2)
f. Checking, inspecting, removing and installing hydraulic power pumps (Level 3)
g. Troubleshooting hydraulic pumps (Level 3)
h. Removing, installing, inspecting, servicing and checking a hydraulic accumulator (Level 3)
i. Troubleshooting and determining the cause of low, high or fluctuating hydraulic pressure (Level 3)
j. Inspecting, checking and servicing a hydraulically operated flap system (Level 3)

TASK

AF-35 Inspecting, checking, servicing and repairing landing gear, retraction systems, shock struts, brakes, wheels, tires and steering systems (Level 3)

PERFORMANCE OBJECTIVE

Inspect, check, service and repair landing gear, retraction systems, shock struts, brakes, wheels, tires and steering systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Main landing gear alignment, support and retraction
b. Emergency extension system
c. Safety devices
d. Nose wheel steering and shimmy dampers
e. Brake assemblies and systems
f. Inspection and maintenance of brake systems
g. Aircraft wheels, tires and tubes
h. Inspection and repair of wheels and tires
i. Antiskid systems
j. Land gear system maintenance

Provide Demonstration On:

a. Retraction test
b. Mounting tires correctly and safely
c. Installing wheels on aircraft
d. Bleeding brakes

Provide Practical Application On:

a. Cleaning and storing tires (Level 2)
b. Inspecting, demounting, repairing and installing tires on wheels (Level 3)
c. Removing, inspecting, servicing and re-installing a wheel assembly on the axle (Level 3)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. Aviation Maintenance Publishers, Aircraft Wheels Brakes and Antiskid Systems: Aircraft Tires and Tubes

A/Vs:

(Continued on back)

Tools and Equipment:

a. Live aircraft landing gear (conventional and tricycle)
b. Live aircraft brake systems or mockup
c. Live aircraft retractable land gear system or mockup
d. Live aircraft oleo shock strut or mockup
e. Live aircraft with power brakes or mockup
f. Hand tools
g. Tire handling tools
h. Brake bleeding equipment

LAB HOURS 50

CLASS HOURS 32

EVALUATION (AF-35)

a. Given a live aircraft with hydraulic brakes, the learner will remove one wheel and tire, one wheel brake cylinder and one master cylinder. The tire and tube and the wheel bearings will be separated from the wheel. All parts will be cleaned, inspected and serviced in accordance with the manufacturer's instructions. A parts list of defective parts by part number will be made. Airworthiness directives and service bulletins will be searched. A list of tire storage recommendations will be sought. The wheel brake cylinder will be disassembled, cleaned and inspected in accordance with manufacturer's instructions. The master cylinder will be disassembled, cleaned and inspected in accordance with manufacturer's instructions. All components will be reassembled using approved reference data and will then be re-installed on the aircraft in the correct manner. The brake system will be serviced with the proper fluid and a demonstration of bleeding air from within will be conducted. Brake shoe clearance will be checked and adjusted to the correct value. The manufacturer's brake troubleshooting charts will be located and a list of malfunctions, causes and corrections of brake systems will be listed. All work must be accomplished according to AC43.13-1A or equivalent.

b. Given a live aircraft with an oleo shock strut or a mockup, the learner will disassemble, clean, inspect, repair and reassemble the strut assembly using the manufacturer's manuals and service bulletins. He/she will relate the operation characteristics and will service the unit with oil and air to the recommended degree. All work must be accomplished according to AC43.13-1A or equivalent.

c. Given a live aircraft with retractable landing gear or a mockup, the learner will operate, inspect and adjust the retractable gear mechanism in accordance with manufacturer's specifications.

d. Given a live aircraft, the learner will check the landing gear alignment and determine the approved correcting means without error.

e. Given an aircraft with conventional landing gear and an aircraft with tricycle landing gear, the learner will inspect, adjust and service the nose and tailwheel steering and damping mechanisms in compliance with manufacturer's instructions.

f. Given a live aircraft with a power brake system or a mockup, the learner will inspect, service and describe the operation of the power brake and the emergency brake system referencing manufacturer's instructions.

(Continued on back)

Task AF-35

Evaluation

g. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Landing Gear Systems."

h. Acme, Airframe Mechanic.

i. Acme, Practical Test, Airframe Test Subjects.

j. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

d. Disassembling, identifying components and reassembling mechanical and hydraulic brake assemblies (Level 2)
e. Replacing a brake actuating cylinder (Level 3)
f. Adjusting clearance on a shoe, multiple disc and single disc brake (Level 3)
g. Inspecting, repairing and operationally checking a master cylinder (Level 3)
h. Inspecting, servicing and describing the operation of power brake and emergency brake systems (Level 2)
i. Recognizing probable causes of brake malfunctions (Level 2)
j. Bleeding air from hydraulic brake systems (Level 3)
i. Servicing, repairing and troubleshooting landing gear oleo struts (Level 2)
l. Describing the operation of an oleo strut (Level 2)
m. Operating, inspecting and adjusting a retractable landing gear (Level 3)
n. Checking landing gear alignment (Level 2)
o. Inspecting, adjusting and servicing nose and tail-wheel steering and damping mechanisms (Level 3)

INSTRUCTIONAL MATERIALS

A/Vs:

a. Aviation Maintenance Publishers, "Aircraft Wheels and Brakes," filmstrip EA-AWB and "Aircraft Tubes and Tires," filmstrip EA-ATT; "Oleo Strut Servicing," video-tape ITP-S-102
b. Cessna Aircraft, "Multiple Engine Landing Gear," filmstrip SPAT5280-19

TASK

AF-36 Inspecting, checking and servicing speed and takeoff-warning systems and antiskid electrical brake controls (Level 1)

PERFORMANCE OBJECTIVE

Inspect, check and service speed and takeoff-warning systems and antiskid electrical brake controls.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Stall warning systems
b. Takeoff-warning systems
c. Antiskid system
   1. Skid detectors
   2. Computer
   3. Electrical signals
   4. Cockpit controls
   5. Inspection

Provide Demonstration On:

Operating and testing:
   a. Stall warning systems
   b. Takeoff-warning systems
   c. Antiskid systems

Provide Practical Application On:

a. Identifying principles of operation and inspect speed-stall, takeoff-warning and antiskid brake control systems (Level 1)
b. Showing simulated operation of antiskid and takeoff warning systems (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Aircraft maintenance manuals
b. Live aircraft
c. Hand tools
d. Multimeter

LAB HOURS 5½

CLASS HOURS 5½

EVALUATION (AF-36)

a. Given a live aircraft, a checklist and the appropriate technical manuals, the learner will locate, inspect and check the stall warning system for proper operation. Noted items on the list must be 100% accurate. The system must be correctly diagnosed as being airworthy or not.

b. Given the appropriate aircraft technical manuals, the learner will locate and relate the following data on takeoff-warning systems and antiskid systems.
   1. Principles of operation
   2. Inspection procedures
   3. Service procedures

   All technical references and quoted data must be without error.

c. Allen, National Study, Phase III, Airframe Curriculum, "Position and Warning Systems."

d. Acme, Airframe Mechanic.

e. Acme, Practical Test, Airframe Test Subjects.

f. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-37 Inspecting, checking, troubleshooting, servicing and repairing landing gear position indicating and warning systems (Level 3)

PERFORMANCE OBJECTIVE

Inspect, check, troubleshoot, service and repair landing gear position indicating and warning systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Landing gear safety devices
b. Landing gear position indicators (green and red lights)
c. Lock switches and adjustment
d. Safety while retracting and inspecting landing gear

Provide Demonstration On:

a. Retraction test procedures and safety
b. Adjustment of lock switches

Provide Practical Application On:

Inspecting, checking, troubleshooting, servicing and repairing landing gear position indicating and warning systems (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Live aircraft with retractable landing gear or mockup
b. Aircraft maintenance manual
c. Multimeter
d. Hand tools

LAB HOURS 6

CLASS HOURS 3

EVALUATION (AF-37)

a. Given live aircraft with retractable landing gear containing defects in the indicating system, the learner will inspect, check, troubleshoot, service and repair the systems in accordance with approved data. Systems must be repaired to a return-to-flight level in accordance with applicable data available.

b. Allen, National Study, Phase III, Airframe Curriculum, "Position and Warning Systems."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-38 Installing instruments (Level 2)

PERFORMANCE OBJECTIVE

Install aircraft instrument panels and instruments.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Aircraft instruments and indicators
b. Instrument panels and hardware
c. Range marking
d. Repair of instruments
e. Adjusting instruments
f. Installing instruments
g. Instrument storage
h. Instrument panel shock mounting
i. Troubleshooting procedures

Provide Demonstration On:

a. Installation procedures and practices
b. Swinging a compass
c. Adjusting an altimeter and a rate of climb indicator

Provide Practical Application On:

a. Handling and storing instruments (Level 2)
b. Installing instrument panels and instruments (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair
c. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles
d. Aviation Maintenance Publishers, Aircraft Instrument Systems

Tools and Equipment:

a. Live aircraft
b. Aircraft maintenance manuals
c. Hand tools
d. Aircraft type certificate and data sheets
e. Display of instruments or cut-a-way

LAB HOURS 6

CLASS HOURS 5

EVALUATION (AF-38)

a. Given a live aircraft and the appropriate technical manual, the learner will locate the written data on the removal of the instrument panel and instruments and locate the physical connection points. Data must be located with 100% accuracy.

b. Given a live aircraft, the learner will remove, inspect, demonstrate storage techniques and reinstall selected instruments and/or panels in accordance with the manufacturer's instructions.

c. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Instrument Systems."

d. Acme, Airframe Mechanic.

e. Acme, Practical Test, Airframe Test Subjects.

f. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-39 Inspecting, checking, servicing, troubleshooting and repairing heading, speed, altitude, time, attitude temperature, pressure and position indicating systems (Level 2)

PERFORMANCE OBJECTIVE

Inspect, check, service, troubleshoot and repair heading, speed, altitude, time, attitude, temperature, pressure and position indicating systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Pilot-static systems
b. Maintenance of pilot static systems
c. Capacitor-type fuel quantity systems
d. Fuel flowmeter systems
e. Sources of power for gyro systems
f. Gyro systems
g. Auto-pilot systems
h. Flight director systems
i. Synchro-type indicating systems
j. Compass calibration card
k. Temperature indication systems
l. Pressure indication systems
m. Position indicating systems

Provide Demonstration On:

Inspection and testing techniques and procedures of instrument systems

Provide Practical Application On:

Inspecting, checking, servicing, troubleshooting and repairing instrument systems (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair
c. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles
d. Aviation Maintenance Publishers, Aircraft Instrument Systems

Tools and Equipment:

a. Live aircraft
b. Aircraft maintenance
c. Hand tools

LAB HOURS 5

CLASS HOURS 4

EVALUATION (AF-39)

a. Given a live aircraft and the appropriate technical manuals, the learner will trace and inspect the gyro system, the pilot-static system, manifold pressure system, magnetic compass system and the oil temperature indicating system in accordance with approved standards. All malfunctions will be detected.

b. Given the appropriate technical manuals, the learner will locate troubleshooting and repair charts and procedures for aircraft instruments. Procedures determined must be appropriate to malfunction repair.

c. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Instrument Systems."

d. Acme, Airframe Mechanic.

e. Acme, Practical Test, Airframe Test Subjects.

f. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-40 Inspecting, checking, servicing, troubleshooting and repairing aircraft fuel systems (Level 3)

PERFORMANCE OBJECTIVE

Inspect, check, service, troubleshoot and repair aircraft fuel systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Fuel system requirements
b. Boost pumps
c. Positive displacement pumps
d. Primers
e. Selector and shut-off valves
f. Tank construction
g. Tank installation
h. Servicing fuel tanks
   1. Metal type
   2. Bladder type

Provide Demonstration On:

a. Pressure testing fuel tank
b. Inspection and repairing techniques of fuel system valves and pumps

Provide Practical Application On:

a. Inspecting and servicing fuel tanks (Level 3)
b. Inspecting, checking, servicing, troubleshooting and repairing fuel valves and pumps (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. Aviation Maintenance Publishers, Federal Aviation Regulations Handbook for Aviation Mechanics
c. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Assorted fuel tanks
b. Assorted fuel valves and pumps
c. Hand tools
d. Manufacturer's maintenance materials
e. Live aircraft

LAB HOURS 7

CLASS HOURS 6

EVALUATION (AF-40)

a. Given an aircraft fuel tank, the learner will pressure test and inspect it for conformity to mandatory regulations and airworthiness. All work must conform to manufacturer's service manual guidelines.

b. Given a live aircraft, the learner will locate the fuel tank capacities, inspect for proper fuel tank placarding and demonstrate proper tank servicing according to manufacturer's specifications and specified data.

c. Given a positive displacement type fuel pump, a fuel selector valve, a boost pump and a primer, the learner will disassemble as necessary and explain the operation, service procedure, troubleshooting procedure and legal repair procedure of each. Terminology used and technical references cited must be 100% correct.

d. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Fuel Systems."

e. Acme, Airframe Mechanic.

f. Acme, Practical Test, Airframe Test Subjects.

g. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-41 Repairing aircraft fuel system components (Level 2)

PERFORMANCE OBJECTIVE

Interpret information pertaining to repair of fuel system components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Repair of fuel tanks
b. Strainers
c. Selector valves
d. Fuel lines
e. Fuel drains

Provide Demonstration On:

Using manufacturer's table of limits and overhaul data

Provide Practical Application On:

Interpreting information pertaining to repair of fuel system components (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Fuel system components
b. Component overhaul manuals
c. Hand tools
d. Component special tools

LAB HOURS 5

CLASS HOURS 5

EVALUATION (AF-41)

a. Given two fuel system components and appropriate technical manuals, the learner will disassemble the components and determine if they meet the necessary requirements for airworthiness. Terminology, technical references used and airworthiness decision must be 100% correct.

b. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Fuel Systems."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-42 Inspecting and repairing fuel quantity indicating ststems (Level 2)

PERFORMANCE OBJECTIVE

Inspect and repair fuel quantity indicating systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Sight indicators
b. Mechanical indicators
c. Electrical indicators
d. Electronic indicators

Provide Demonstration On:

Operation and inspection of fuel quantity indicators

Provide Practical Application On:

Inspecting and troubleshooting fuel quantity indication systems (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

FAA, AC65-9A: General Handbook

Tools and Equipment:

a. Live aircraft fuel quantity systems or mockup
b. Aircraft maintenance manual
c. Hand tools
d. Multimeter
e. Indicator components

LAB HOURS 3

CLASS HOURS 3

EVALUATION (AF-42)

a. Given a live aircraft fuel quantity indicating system of either electrical or electronic type or a mockup, the learner will make a complete inspection and test with the proper meter. The learner will state recommended repair practices for each system. Recommendations will be in accordance with the manufacturer's manual and correct terminology will be used.

b. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Fuel Systems."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-43 Inspecting, checking and repairing pressure fueling systems (Level 1)

PERFORMANCE OBJECTIVE

Inspect, check and repair pressure fueling systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Pressure fueling operation
b. Pressure fueling valves
c. Pressure fueling controls, indicators and warning lights
d. Safety devices

Provide Demonstration On:

Connecting and disconnecting single point fueling nozzle

Provide Practical Application On:

Describing the inspection, checking, and repair of pressure fueling systems (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Aircraft requiring pressure fueling
b. Manufacturer's manual
c. Fueling equipment

LAB HOURS 0

CLASS HOURS 2

EVALUATION (AF-43)

a. Given an appropriate aircraft technical manual for an aircraft with pressure fueling means, the learner will locate and describe the proper procedures of inspection, checking and repairing the pressure fueling system. The repair practices and recommendations of the manual will be interpreted without error. Correct nomenclature will be used as a part of all described repairs.

b. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Fuel Systems."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-44 Checking and servicing fuel dump systems (Level 1)

PERFORMANCE OBJECTIVE

Check and service fuel dump systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Fuel dumping requirements
b. Fuel dumping components
c. Fuel dumping system

Provide Demonstration On:

Operation of the fuel dump system

Provide Practical Application On:

Describing the checking and servicing of a fuel dump system (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Aircraft equipped with a fuel dump system
b. Manufacturer's manual

LAB HOURS	0
CLASS HOURS	1

EVALUATION (AF-44)

a. Given an appropriate aircraft technical manual for an aircraft with fuel dumping means, the learner will locate and describe the proper procedures of checking and servicing the fuel dump system. Correct nomenclature and terminology will be required as a part of the description.

b. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Fuel Systems."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-45 Performing fuel management transfer and defueling (Level 1)

PERFORMANCE OBJECTIVE

Perform fuel transfer and defueling.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Multi-tank installations
b. Fuel transfer means
c. Aircraft defueling
d. Fuel management procedures

Provide Demonstration On:

a. Operation of fuel transfer system in a large aircraft
b. Safety while defueling

Provide Practical Application On:

Performing fuel transfer and defueling (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Aircraft capable of fuel transfer
b. Defueling equipment
c. Manufacturer's manuals

LAB HOURS 0

CLASS HOURS 2

EVALUATION (AF-45)

a. Given an appropriate aircraft technical manual for an aircraft with fuel transfer means, the learner will locate and describe the proper procedure for fuel transfer. Correct nomenclature and terminology will be used as a part of the description of operation.

b. Given a live aircraft, defueling equipment and appropriate technical manuals, the learner will relate the proper defueling procedure and safety precautions to be observed. Procedure and safety precautions must be 100% correct.

c. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Fuel Systems."

d. Acme, Airframe Mechanic.

e. Acme, Practical Test, Airframe Test Subjects.

f. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-46 Troubleshooting, servicing and repairing pressure and temperature warning systems (Level 2)

PERFORMANCE OBJECTIVE

Troubleshoot, service and repair fuel pressure and temperature warning systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Fuel pressure warning signals
b. Valve-in-transit indicator lights
c. Fuel temperature warning system
d. Sensing devices
e. Annunciators

Provide Demonstration On:

a. Operation of pressure warning mechanism
b. Operation of turbine fuel temperature indicator system

Provide Practical Application On:

Operating and adjusting the fuel pressure and temperature sensing devices

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Technical manuals
b. Fuel pressure warning mechanism mockup
c. Fuel temperature warning mechanism mockup
d. Multimeter

LAB HOURS 1

CLASS HOURS 1

EVALUATION (AF-46)

a. Given fuel pressure warning and fuel temperature warning mockups and the appriate technical data, the learner will troubleshoot, service and repair both systems. Procedural steps identified in the technical manual must be used. The problem(s) must be identified and repairs carried out in accordance with applicable technical manuals.

b. Allen, National Study, Phase III, Airframe Curriculum, "Aircraft Fuel Systems."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-47 Inspecting, checking and servicing auto-pilot and approach control systems (Level 1)

PERFORMANCE OBJECTIVE

Identify purposes and operating principles of auto-pilot and approach control systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Instrument landing system
b. Marker beacons
c. Auto-pilots for light aircraft
d. Auto-pilots for jet aircraft
e. Auto-pilot sensing devices
f. Servos
g. Installation requirements
h. Position transmitters and trim indicators
i. Altitude hold and approach control functions of auto-pilot

Provide Demonstration On:

a. Basic I.L.S. operation
b. Basic auto-pilot operation

Provide Practical Application On:

Identifying purposes and operating principles of auto-pilots and approach control systems (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles

A/Vs:

Aviation Maintenance Publishers, "Basic Electronics and Radio Installation," Part II, filmstrip EA-BEM

Tools and Equipment:

a. Live aircraft with auto-pilot and instrument landing capabilities or mockup
b. Subject technical manuals

LAB HOURS 0

CLASS HOURS 5

EVALUATION (AF-47)

a. Given live aircraft with an auto-pilot and instrument landing devices or a suitable mockup, the learner will identify the basic components of each and explain their functions. Identification of all components and terminology used must be 100% correct.

b. Allen, National Study, Phase III, Airframe Curriculum, "Communication and Navigation Systems."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-48 Inserting, checking and servicing aircraft electronic communication and navigation systems (Level 1)

PERFORMANCE OBJECTIVE

Inspect, check and service aircraft electronic communication and navigation systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Power supplies
b. Communication systems
c. Airborne navigation equipment
d. VHF omnirange system
e. Distance measuring equipment
f. Automatic direction finders
g. Radar beacon transponder
h. Doppler navigation system
i. Inertial navigation system
j. Airborne weather radar
k. Radio altimeter
l. Emergency locator transmitter
m. FCC regulations

Provide Demonstration On:

Basic operation techniques of radios and systems

Provide Practical Application On:

a. Identifying types and installations of aircraft electronic communications and navigation equipment (Level 1)
b. Locating the FCC regulation pertaining to two-way radio operation (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles

A/Vs:

Aviation Maintenance Publishers, "Basic Electronics and Radio Installations," filmstrip EA-BEM

Tools and Equipment:

a. Live aircraft with communication and navigation equipment or mockup
b. Electronic equipment operation and technical data
c. FCC regulations

LAB HOURS 0

CLASS HOURS 5

EVALUATION (AF-48)

a. Given a live aircraft with communication and navigation equipment installed or a suitable mockup, the learner will identify the different types of equipment and relate the basic operations procedure of each. Use of correct terminology and written operating procedures must be 100% correct.

b. Given FCC regulations, the learner will locate and relate the requirement for operating a two-way radio. Use of correct terminology and technical references cited must be 100% correct.

c. Allen, National Study, Phase III, Airframe Curriculum, "Communication and Navigation Systems."

d. Acme, Airframe Mechanic.

e. Acme, Practical Test, Airframe Test Subjects.

f. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-49 Inspecting and repairing antenna and electronic equipment installations (Level 2)

PERFORMANCE OBJECTIVE

Repair or replace aircraft antennas and static dischargers.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Installation of communication and navigation equipment
b. Reducing radio interference
c. Installation of aircraft antenna systems
d. FAR procedures after radio installation
e. Static dischargers
f. Corona static
g. Function and types of dischargers
   1. Carbon wick
   2. Metallic braid
   3. Null field
h. Static discharger mounting

Provide Demonstration On:

a. Installation techniques of radios and antennas
b. Proper grounding techniques of electronic equipment

Provide Practical Application On:

a. Repairing or replacing aircraft antennas and related electronic equipment (Level 2)
b. Identifying and describing the purposes of static discharges (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. FAA, AC43.13-2A: Acceptable Methods, Techniques and Practices - Aircraft Alterations

Tools and Equipment:

a. Live aircraft with electronic equipment and antennas
b. Static dischargers
c. Hand tools
d. Tools and materials for antenna installation

LAB HOURS 5

CLASS HOURS 5

EVALUATION (AF-49)

a. Given a live aircraft with electronic equipment and antennas, the learner will remove selected radios and antennas, determine their installation acceptance, reinstall them and check their functions for accurateness. All work and serviceability decisions must be in accordance with AC43.13-1A and/or AC43.13-2A.

b. Given two types of static dischargers, the learner will identify each and explain their purposes. Correct terminology must be used. Explanation of purpose must coincide with applicable technical manuals.

c. Allen, National Study, Phase III, Airframe Curriculum, "Communication and Navigation Systems."

d. Acme, Airframe Mechanic.

e. Acme, Practical Test, Airframe Test Subjects.

f. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL MATERIALS

A/Vs:

Aviation Maintenance Publishers, "Basic Electronics and Radio Installations," filmstrip EA-BEM

TASK

AF-50 Inspecting, checking, troubleshooting, servicing and repairing heating, cooling, air conditioner and pressurization systems (Level 1)

PERFORMANCE OBJECTIVE

Identify principles of operation, inspection and troubleshooting heating, cooling, air conditioning and pressurization systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Atmosphere composition and the need for oxygen
b. Pressurization sources, valves and systems
c. Air conditioning system
d. Heating systems and controls
e. Air cycle system components and operation
f. Vapor cycle system components and operation

Provide Demonstration On:

a. Inspecting procedures for aviation heaters
b. Basic operation of air conditioning systems for aircraft
c. Basic operation of pressurization system

Provide Practical Application On:

a. Inspecting, checking and troubleshooting aircraft combustion heater and exhaust type heat exchangers (Level 1)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair
c. Aviation Maintenance Publishers, Aircraft Air Conditioning Systems

A/Vs:

Aviation Maintenance Publishers, "Aircraft Air Conditioning Systems," filmstrip EA-AAS

Tools and Equipment:

a. Live aircraft or mockups of:
   1. Combustion heater
   2. Exhaust type heat exchanger
   3. Vapor cycle air condition system
   4. Air cycle air condition system
b. Operation and technical manual for the above units

LAB HOURS 0

CLASS HOURS 14

EVALUATION (AF-50)

a. Given live aircraft, one with a combustion heater installation and the other with an exhaust type heat exchanger, or appropriate mockups, the learner will relate inspection, checking and troubleshooting procedures. Procedures must be in conformity with manufacturer's manuals. Correct terminology must be used.

b. Given a live aircraft with a vapor cycle cooling system or a mockup and appropriate technical manuals, the learner will relate the functions and principles of operation and locate checking and troubleshooting information. Functions and principles must be explained without error. Troubleshooting guidelines must conform to manufacturer's specifications.

c. Given various related technical manuals, the learner will locate and relate checking and troubleshooting data for air cycle cooling systems. Technical references used must be correct. Data located must conform to manufacturer's manual.

d. Given a live aircraft equipped with cabin pressurization or a mockup and appropriate technical manuals, the learner will identify the basic pressurization components and will relate the principles of operation and control. Identification and principles of operation described for each component must be 100% correct.

e. Allen, National Study, Phase III, Airframe Curriculum, "Cabin Atmosphere Control Systems."

f. Acme, Airframe Mechanic.

g. Acme, Practical Test, Airframe Test Subjects.

h. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

b. Checking and troubleshooting aircraft vapor cycle and air cycle cooling systems (Level 1)
c. Identifying functions and principles of operation of aircraft air conditioning (Level 1)
d. Identifying principles of operation and control of cabin pressurization (Level 1)

TASK

AF-51 Inspecting, checking, troubleshooting, servicing and repairing oxygen systems (Level 2)

PERFORMANCE OBJECTIVE

Inspect, check, troubleshoot, service and repair oxygen systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Oxygen systems - general
b. Portable oxygen equipment
c. Oxygen cylinders
d. Solid state oxygen systems
e. Oxygen valves and plumbing
f. Oxygen regulators, flow indicators and pressure gauges
g. Oxygen masks
h. Servicing oxygen systems
i. Oxygen safety precautions
j. Anoxia
k. Cabin altitudes
l. Soap and water testing
m. Color coding and placarding

Provide Demonstration On:

Service techniques and safety precautions in servicing oxygen systems

Provide Practical Application On:

Inspecting, checking and servicing oxygen systems (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Maintenance and Repair

A/Vs:

Aviation Maintenance Publishers, "Aircraft Oxygen Systems," filmstrip EA-AOS

Tools and Equipment:

a. Live aircraft with oxygen system or mockup
b. Aircraft maintenance manual or oxygen system service information
c. Hand tools
d. Oxygen system service tools
e. Soapy solution for leak testing

LAB HOURS 4

CLASS HOURS 3

EVALUATION (AF-51)

a. Given a live aircraft with an oxygen system or a mockup, a system checklist and appropriate technical manuals, the learner will check and service oxygen systems. All performance must be in compliance with checksheet provided.

b. Allen, National Study, Phase III, Airframe Curriculum, "Cabin Atmosphere Control Systems."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-52 Repairing heating, cooling, air conditioning, pressurization and oxygen system components (Level 1)

PERFORMANCE OBJECTIVE

Identify procedures for repair and replacement of heating, cooling, air conditioning, pressurization and oxygen system components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Air conditioning and pressurization system maintenance
b. Cabin pressurization operational check and troubleshooting
c. Combustion heater components
   1. Air inlets
   2. Exhaust
   3. Fuel nozzle
   4. Sparking device
   5. Thermal switches
d. Combustion heater maintenance
e. Air cycle cooling systems
f. Refrigeration cycle components

Provide Demonstration On:

Repair and replacement techniques for air conditioning, pressurization and oxygen systems and components

Provide Practical Application On:

a. Identifying components of an aircraft combustion heater freon cooling system and an air-cycle expansion turbine (Level 1)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Maintenance and Repair

A/Vs:

Aviation Maintenance Publishers, "Aircraft Air Conditioning Systems," filmstrip EA-ACC and "Aircraft Oxygen Systems," filmstrip EA-AOS

Tools and Equipment:

a. Live aircraft with the following systems or mockups
   1. Combustion heater systems
   2. Vapor cycle cooling systems
   3. Air cycle cooling systems

(Continued on back)

LAB HOURS	0
CLASS HOURS	9

EVALUATION (AF-52)

a. Given a live aircraft with air conditioning, pressurization, oxygen systems or mockups and appropriate technical manuals, the learner will locate, specify the repair or replacement data and relate it to the applicable system. Technical references and terminology used must be without error.

b. Given a live aircraft with combustion heaters, freon cooling systems, air cycle cooling systems, or mockups and appropriate technical manuals, the learner will identify specific system components. Identification of each component, technical references and terminology used must be without error.

c. Allen, National Study, Phase III, Airframe Curriculum, "Cabin Atmosphere Control Systems."

d. Acme, Airframe Mechanic.

e. Acme, Practical Test, Airframe Test Subjects.

f. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

b. Identifying repair or replacement procedures for air conditioning and pressurization components (Level 1)
c. Identifying repair or replacement procedures for aircraft oxygen components (Level 1)

INSTRUCTIONAL MATERIALS

Tools and Equipment:

4. Air conditioning and pressurization systems
5. Oxygen systems

b. Technical manuals for above aircraft or systems

TASK

AF-53 Inspecting, checking, troubleshooting, servicing and repairing airframe ice and rain control systems (Level 2)

PERFORMANCE OBJECTIVE

Inspect and service airframe ice and rain control systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Pneumatic de-icing systems and components
b. Pneumatic de-icing system maintenance
c. Thermal anti-icing systems
d. Ground de-icing of aircraft
e. Windshield ice control systems
f. Water and toilet drain heaters
g. Rain eliminating systems
h. Maintenance of rain eliminating systems
i. Static vent anti-icing
j. Engine air intake anti-icing

Provide Demonstration On:

a. Maintenance and operation techniques of de-icing and anti-icing systems
b. Inspection and maintenance techniques of pilot static systems

Provide Practical Application On:

a. Identifying principles of installations, operation and checking devicing and anti-icing systems (Level 1)
b. Replacing, inspecting and checking operation of electrically operated air scoop and pilot static or static vent anti-icing (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair

A/Vs:

Aviation Maintenance Publishers, "Aircraft Pneumatic Systems," filmstrip EA-APS

Tools and Equipment:

a. Live aircraft with de-icing and anti-icing systems or mockups
b. Live aircraft with heated pilot tube or mockup
c. Live aircraft with electrically operated air scoop
d. Aircraft maintenance manuals
e. Hand tools
f. Multimeter

LAB HOURS	8
CLASS HOURS	4

EVALUATION (AF-53)

a. Given live aircraft with two types of anti-icing and de-icing systems and appropriate technical manuals, the learner will determine the principles of installation, operation and checking. Technical references and terminology used must be without error.

b. Given aircraft with electrically operated air scoop, pilot static anti-icing and appropriate technical manuals, the learner will determine approved inspection and replacement data and will function test both systems. Condition and air worthiness of systems must be stated. Any deficiencies must be noted.

c. Allen, National Study, Phase III, Airframe Curriculum, "Ice and Rain Control Systems."

d. Acme, Airframe Mechanic.

e. Acme, Practical Test, Airframe Test Subjects.

f. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-54 Inspecting, checking and servicing smoke and carbon monoxide detection systems (Level 1)

PERFORMANCE OBJECTIVE

Identify principles of operation of smoke and carbon monoxide detection systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Smoke detection systems
b. Smoke detectors
c. Carbon monoxide detectors
d. Photo-cells
e. Air sampling

Provide Demonstration On:

a. Interpreting detector electrical schematics
b. Color coding identification of carbon monoxide detectors

Provide Practical Application On:

Identifying principles of operation of smoke and carbon monoxide detectors (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Live aircraft with smoke and carbon monoxide detector systems or mockup
b. Aircraft maintenance manual

LAB HOURS 0

CLASS HOURS 1

EVALUATION (AF-54)

a. Given a live aircraft with smoke and carbon monoxide detection systems or mockups and appropriate technical manuals, the learner will identify the basic components and relate the principles of operation. Technical references and terminology will be without error.

b. Allen, National Study, Phase III, Airframe Curriculum, "Fire Protection Systems."

c. Acme, Airframe Mechanic.

d. Acme, Practical Test, Airframe Test Subjects.

e. FAA, AC65-21, Airframe Written Test Guide.

TASK

AF-55 Inspecting, checking, servicing, troubleshooting and repairing aircraft fire detection and extinguishing systems (Level 3)

PERFORMANCE OBJECTIVE

Inspect, check, service, troubleshoot and repair aircraft fire detection and extinguishing systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Fire detection systems
b. Types of fires
c. Fire zone classification
d. Extinguishing agents
e. Fire detection system maintenance and troubleshooting
f. Fire extinguishing system maintenance
g. Fire prevention and protection

Provide Demonstration On:

a. Operation of different fire detectors
b. Operation of built in fire extinguisher
c. Operating a hand fire extinguisher

Provide Practical Application On:

a. Inspecting, checking, troubleshooting and repairing fire detection systems (Level 3)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Maintenance and Repair

Tools and Equipment:

a. Types of fire extinguishers
b. Live aircraft with fire detection and extinguishing systems
c. Hand tools
d. Multimeter
e. Weighing scales
f. Aircraft maintenance manuals

LAB HOURS 7

CLASS HOURS 4

EVALUATION (AF-55)

a. Given two types of fire detection systems in aircraft or mockups with appropriate technical data, the learner will inspect, check, troubleshoot and repair induced problems. All deficiencies will be discovered and repaired according to manufacturer's specifications.

b. Given mock situations of aircraft related fires, the learner will demonstrate proper selection of fire extinguishers and correct methods of utilizing them effectively without error.

c. Given a live aircraft with a built-in fire extinguishing system or a mockup and appropriate technical manuals, the learner will demonstrate the proper methods of checking, troubleshooting and repairing the various components. All deficiencies will be discovered according to manufacturer's specifications.

d. Allen, National Study, Phase III, Airframe Curriculum, "Fire Protection Systems."

e. Acme, Airframe Mechanic.

f. Acme, Practical Test, Airframe Test Subjects.

g. FAA, AC65-21, Airframe Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

b. Selecting and operating fire extinguishers (Level 2)
c. Checking, troubleshooting and repairing aircraft built-in fire extinguishing systems (Level 2)

TASK

PP-01 Identifying and selecting lubricants (Level 2)

PERFORMANCE OBJECTIVE

Identify and select powerplant lubricants.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Principles of engine lubrication
b. Requirements and characteristics of reciprocating engine lubricants
c. Requirements for turbine engine lubricants
d. Additives in engine oil
e. Oil containers

Provide Demonstration On:

a. Identifying aviation lubricants
b. Proper techniques for selecting lubricants

Provide Practical Application On:

a. Identifying characteristics of lubricants (Level 1)
b. Identifying the secondary functions of lubricating oil (Level 1)
c. Recognizing and identifying acceptable lubricants (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

A/Vs:

Aviation Maintenance Publishers, "Aircraft Reciprocating Engines," filmstrip EA-ARE

Tools and Equipment:

a. Aircraft maintenance manuals
b. Aircraft lubricants in their respective containers
c. Engine overhaul manual
d. Engine service bulletins

LAB HOURS 5½

CLASS HOURS 5

EVALUATION (PP-01)

a. Given an engine, the appropriate technical manuals and various lubricants in their respective containers, the learner will identify and select the proper lubricants for varying climatic conditions and for engine break-in. He/she will additionally identify and relate the basic required characteristics for aviation lubricants and the secondary functions of lubricating oils. Selection and identification of lubricants must be without error. Written characteristics and explanations of secondary functions of lubricating oils will be according to reference information.

b. Allen, National Study, Powerplant Curriculum, "Lubrication Systems."

c. Acme, Powerplant Mechanic.

d. Acme, Practical Test, Powerplant Test Subjects.

e. FAA, AC65-22, Powerplant Written Test Guide.

TASK

PP-02 Inspecting, checking, servicing, troubleshooting and repairing engine lubrication systems (Level 3)

PERFORMANCE OBJECTIVE

Inspect, check, service, troubleshoot and repair engine lubrication systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Reciprocating engine lubricating systems
b. Internal lubrication of reciprocating engines
c. Lubrication system maintenance practices
d. Turbine engine lubricating systems

Provide Demonstration On:

a. Maintenance and inspection techniques of lubrication systems
b. Evaluating oil screen filtered contents

Provide Practical Application On:

a. Diagraming and explaining the operation of wet and dry sump lubrication systems (Level 2)
b. Changing oil (Level 3)
c. Servicing an oil by-pass valve (Level 3)
d. Servicing disc-type oil filters (Level 3)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants
c. Aviation Maintenance Publishers, Federal Aviation Regulations Handbook for Aviation Mechanics
d. Aviation Maintenance Publishers, Aircraft Gas Turbine Powerplants

Student Manuals:

Aviation Maintenance Publishers, Aircraft Gas Turbine Powerplant Workbook

Tools and Equipment:

a. Operable aircraft engines
b. Aircraft with wet sump lubrication system
c. Aircraft with dry sump lubrication system
d. Engine installation with disc-type oil filter
e. Aircraft maintenance manuals
f. Engine overhaul manuals

(Continued on back)

LAB HOURS 22

CLASS HOURS 18½

EVALUATION (PP-02)

a. Given an operable aircraft engine and the appropriate technical manuals, the learner will change the oil, inspect the oil screen for return to service and service the oil screen by-pass value. Additionally the learner will locate oil pressure and temperature operating limits and will operate the engine to see that said limits are not exceeded. He/she will increase or decrease oil pressure by adjustment and again operate the engine to identify the change. Oil change and inspection must be in accordance with manufacturer's instructions. Oil pressure must be within specifications and no oil leakage is allowed.

b. Given an aircraft with a dry sump lubrication system and an aircraft with a set sump lubrication system and the appropriate technical manuals, the learner will inspect, diagram and explain the operation of each. A list will be made for each engine type. Identifying the method of lubrication of each engine component, FAA regulations pertaining to oil systems and components will be located and listed. Completion of each section must be without error.

c. Given an engine installation with a disc-type oil filter and the appropriate technical manual, the learner will remove, inspect and reinstall the filter to airworthiness standards.

d. Given an aircraft engine piston, rings and the appropriate technical data, the learner will install the rings and describe the factors affecting oil consumption of the engine. Rings must be installed according to manufacturer's specifications and without breakage. Description of oil consumption factors must be 100% accurate.

e. Allen, National Study, Powerplant Curriculum, "Lubrication Systems."

f. Acme, Powerplant Mechanic.

g. Acme, Practical Test, Powerplant Test Subjects.

h. FAA, AC65-22, Powerplant Written Test Guide.

Task PP-02

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

e. Describing the purpose of oil pressure gauge line restrictors (Level 2)
f. Identifying components of an oil scavenging system, describing operation of the system and troubleshooting (Level 2)
g. Interpreting FFA regulations pertaining to oil supply tanks (Level 2)
h. Explaining the purpose and describing the operation of an oil dilution system (Level 2)
i. Adjusting oil pressure of an operable engine (Level 2)
j. Interpreting instrument indications (Level 2)
k. Describing the lubrication of a valve mechanism (Level 2)
l. Installing rings on a piston and describing the factors affecting oil consumption in a piston engine (Level 3)

INSTRUCTIONAL MATERIALS

Tools and Equipment:

g. Engine service bulletins
h. Hand tools
i. Piston and rings
j. Special engine tools

TASK

PP-03 Repairing engine lubrication system components (Level 2)

PERFORMANCE OBJECTIVE

Repair engine lubrication system components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Inspection and repair of lubrication system components
b. Overhaul of engine oil pump
c. Cleaning and replacement of oil lines and fittings
d. Oil temperature regulation
e. Oil cooler operation
f. Cleaning and testing oil tanks

Provide Demonstration On:

a. Inspection techniques of oil lines
b. Pressure testing oil tanks
c. Dimension of an oil pump

Provide Practical Application On:

a. Inspecting, removing, cleaning and reinstalling oil lines (Level 2)
b. Identifying and describing oil temperature regulation (Level 2)
c. Explaining the procedure for cleaning and testing oil tanks (Level 1)
d. Disassembling and reassembling an engine oil pump (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

Tools and Equipment:

a. Engine installation with oil cooler and external oil lines
b. Engine oil pump assembly
c. Aircraft maintenance manual
d. Engine overhaul manual
e. Hand tools and special tools

LAB HOURS 4

CLASS HOURS 11

EVALUATION (PP-03)

a. Given an aircraft engine installation equipped with an oil cooler and external oil lines and appropriate technical manuals, the learner will remove the entire oil temperature regulator assembly and the oil lines. The lines will be inspected, cleaned and reinstalled. The components of the temperature regulator will be identified and a description of temperature regulation will be given. Work must meet given technical specifications and no oil leaks are allowed. Identification and description of components must be 100% accurate.

b. Given an oil pump assembly and the appropriate technical manual, the learner will disassemble, inspect, explain the operation and reassemble the pump without error.

c. Given the appropriate technical manuals, the learner will locate and explain the correct procedure for safely cleaning and pressure testing aircraft oil tanks without error.

d. Allen, National Study, Powerplant Curriculum, "Lubrication Systems."

e. Acme, Powerplant Mechanic.

f. Acme, Practical Test, Powerplant Test Subjects.

g. FAA, AC65-22, Powerplant Written Test Guide.

TASK

PP-04 Inspecting, checking, servicing, troubleshooting and repairing engine fuel systems (Level 3)

PERFORMANCE OBJECTIVE

Interpret FFA fuel system regulations and inspect, check, service, troubleshoot and repair engine fuel systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. FFA regulations
b. Fuel system requirements
c. Basic fuel system operation for reciprocating engines
d. Basic fuel system operation for turbine engines
e. Strainers
f. Routing fuel lines
g. Vents and sumps
h. Draining fuel
i. Fuel contamination

Provide Demonstration On:

a. Interpreting FFA regulation on fuel systems
b. Inspection and maintenance techniques for fuel systems

Provide Practical Application On:

a. Interpreting Federal Aviation Regulations governing fuel systems (Level 2)
b. Inspecting, checking, troubleshooting and repairing an engine fuel system (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. FAA, AC65-12A: Powerplant Handbook
c. McGraw-Hill, Aircraft Powerplants

(Continued on back)

Student Manuals:

Aviation Maintenance Publishers, Aircraft Gas Turbine Powerplant Workbook

Tools and Equipment:

a. Aircraft engine installation with pressure fuel system
b. Aircraft engine installation with gravity flow fuel system
c. Federal Aviation Regulation (Part 23)
d. Aircraft maintenance manuals
e. Hand tools

LAB HOURS 3

CLASS HOURS 2

EVALUATION (PP-04)

a. Given Federal Aviation Regulation Part 23, the learner will locate and list all regulations pertaining to both piston and turbine powered aircraft fuel systems. One hundred percent accuracy is required.

b. Given an aircraft engine installation with a pressure fuel system, an aircraft engine installation with gravity flow fuel system and the appropriate technical manuals, the learner will trace, diagram and relate both systems flow and component parts. He/she will remove, inspect and reinstall the main strainers, check the operation of all valves for conformity to approved data and flow test the system for proper operation and condition. All work must be in accordance with specified data and with no fuel leaks.

c. Allen, National Study, Powerplant Curriculum, "Engine Fuel Systems."

d. Acme, Powerplant Mechanic.

e. Acme, Practical Test, Powerplant Test Subjects.

f. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL MATERIALS

Textbooks:

d. Aviation Maintenance Publishers, Federal Aviation Regulations Handbook for Aircraft Mechanics
e. Aviation Maintenance Publishers, Aircraft Gas Turbine Powerplants

TASK

PP-05 Repairing engine fuel system components (Level 2)

PERFORMANCE OBJECTIVE

Remove and install engine driven and electric fuel pumps.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Engine driven pumps
b. Auxiliary pumps
c. Vane and diaphragm types

Provide Demonstration On:

a. Engine driven pump operation and adjustment
b. Auxiliary pump features and operation

Provide Practical Application On:

a. Describing the operation of fuel pumps and removing and installing a pump on an engine (Level 2)
b. Describing the operation of auxiliary and boost pumps
c. Removing and installing an auxiliary or boost pump in a system (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. Aviation Maintenance Publishers, Aircraft Gas Turbine Powerplants

Student Manuals:

Aviation Maintenance Publishers, Aircraft Gas Turbine Powerplant Workbook

Tools and Equipment:

a. Aircraft engine installation with engine drive pump
b. Auxiliary fuel pump installation
c. Hand tools
d. Aircraft maintenance manual

LAB HOURS 5

CLASS HOURS 3½

EVALUATION (PP-05)

a. Given an aircraft engine installation fitted with an engine driven fuel pump, the learner will remove the pump, explain the internal works, demonstrate the adjustment procedure and reinstall the unit in accordance with manufacturer's instructions. Correct nomenclature must be used during explanation.

b. Given an auxiliary fuel pump installation and the appropriate technical data, the learner will remove the pump assembly, explain the mechanism and operation and reinstall according to manufacturer's instructions. Correct nomenclature must be used during explanation.

c. Allen, National Study, Powerplant Curriculum, "Engine Fuel Systems."

d. Acme, Powerplant Mechanic.

e. Acme, Practical Test, Powerplant Test Subjects.

f. FAA, AC65-22, Powerplant Written Test Guide.

TASK

PP-06 Inspecting, checking, servicing, troubleshooting and repairing reciprocating and turbine engine fuel metering systems (Level 1)

PERFORMANCE OBJECTIVE

Inspect, check, service, troubleshoot and repair reciprocating and turbine engine fuel metering systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Fuel metering devices for reciprocating engines
b. Carburetion principles
c. Carburetor types and systems
d. Carburetor icing
e. Float type carburetors
f. Pressure carburetors
g. Direct fuel injection
h. Continuous flow fuel injection
i. Jet fuel controls and systems
j. Vapor separators and vents
k. Air/fuel adjustments
l. Mechanical linkage adjustments

Provide Demonstration On:

a. Float type carburetor components and operation
b. Pressure carburetor principles
c. Continuous flow fuel injection operation
d. Direct fuel injection operation
e. Jet fuel control principles

Provide Practical Application On:

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants
c. Aviation Maintenance Publishers, Fuel Metering Systems

A/Vs:

(Continued on back)

Tools and Equipment:

a. Operable engine with float type carburetor
b. Operable engine with either pressure carburetor or fuel injection
c. Pressure carburetor or schematic
d. Direct fuel injection system or schematic
e. Continuous flow fuel injection system or schematic

(Continued on back)

LAB HOURS

CLASS HOURS

EVALUATION (PP-06)

a. Given an operable engine with a flow-type carburetor and an operable engine with either a pressure carburetor or a fuel injection system and the appropriate technical manuals, the learner will inspect, remove and install both types of fuel metering devices, operate the engines and adjust idle speed and idle mixture to the given specifications. He/she will describe the operation of the metering devices, explain the effects of temperature, pressure and humidity on their operation and identify the dangers of excessively rich and excessively lean fuel-air mixtures to engine operation. Each part of the task will be completed without error and in accordance with manufacturer's specifications.

b. Given either the actual components or schematics of a pressure type carburetor, a direct fuel injection system and a continuous flow fuel injection system and the appropriate technical manuals, the learner will relate the comparative difference of each type system and will identify and explain the component parts of each fuel metering device. Correct technical references and nomenclature will be used.

c. Given a turbine engine installation and the appropriate technical manuals, the learner will rig the fuel control to the proper degree and explain the trimming process without error.

d. Allen, National Study, Powerplant Curriculum, "Fuel Metering Systems."

e. Acme, Powerplant Mechanic.

f. Acme, Practical Test, Powerplant Test Subjects.

g. FAA, AC65-22, Powerplant Written Test Guide.

Task PP-06

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

a. Determining temperature, pressure and humidity effects on operation of a carburetor (Level 2)
b. Describing the operation of a float carburetor (Level 2)
c. Identifying a pressure type carburetor and a direct fuel injection system and describing the operation of each system (Level 2)
d. Explaining the function of vapor separators and vapor vents (Level 2)
e. Comparing continuous flow fuel injection and direct cylinder injection systems
f. Inspecting, removing and installing a float type carburetor, operating the engine and adjusting idle speed and idle mixture (Level 3)
g. Inspecting, removing and installing a pressure carburetor or fuel injection system, operating the engine and adjusting idle speed and idle mixture (Level 3)
h. Identifying the dangers of excessively rich and excessively lean fuel-air mixtures (Level 2)
i. Rigging the fuel control unit on a static turbo jet engine and describing the trimming of the engine (Level 2)

INSTRUCTIONAL MATERIALS

A/Vs:

a. Aviation Maintenance Publishers, "Fuel Metering Systems," filmstrip EA-FMS
b. Cessna Aircraft Co., "Fuel Injection Technical Training," filmstrip SPA-73294-19

Tools and Equipment:

f. Turbine engine
g. Aircraft maintenance manuals
h. Engine overhaul manuals
i. Fuel metering devices
j. Hand tools

TASK

PP-07 Overhauling carburetors (Level 2)

PERFORMANCE OBJECTIVE

Identify and describe the function of components used in float and pressure type carburetors.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

Carburetor maintenance and overhaul of
a. Float carburetors
b. Pressure carburetors
c. Fuel metering
d. Fuel and air flow
e. Main discharge nozzles
f. Acceleration systems
g. Idle circuit
h. Primary and secondary circuits
i. Mixture controls

Provide Demonstration On:

a. Float type carburetor maintenance and operation
b. Pressure carburetor maintenance and operation

Provide Practical Application On:

a. Identifying venturi size and describing function (Level 2)
b. Interpreting and using charts and diagrams to explain fuel and airflow through float and pressure carburetors (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

A/Vs:

Aviation Maintenance Publishers, "Fuel Metering Systems," filmstrip EA-FMS

Tools and Equipment:

a. Float type carburetors
b. Pressure carburetors
c. Carburetor maintenance manuals
d. Hand tools and special carburetor tools
e. Carburetor cleaning solution
f. Carburetor components

LAB HOURS 12

CLASS HOURS 8

EVALUATION (PP-07)

a. Given two different types of float carburetors and the appropriate technical manuals, the learner will disassemble the carburetors to an assigned degree, identify all systems and their related parts, explain the technical design of each and describe their operations. Correct nomenclature and technical references must be 100% accurate.

b. Given a pressure carburetor and the appropriate technical manuals, the learner will locate and describe the carburetor's systems and major components and will relate the principles of operation as a unit. Correct nomenclature and technical references must be 100% accurate.

c. Allen, National Study, Powerplant Curriculum, "Fuel Metering Systems."

d. Acme, Powerplant Mechanic.

e. Acme, Practical Test, Powerplant Test Subjects.

f. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

c. Removing, installing and explaining the principles of fuel metering through a jet (Level 2)
d. Identifying and describing the operation of an air bleed (Level 2)
e. Locating and describing the operation of the main discharge nozzle in a pressure carburetor (Level 2)
f. Identifying acceleration systems in float and pressure carburetors and describing the operation of each system (Level 2)
g. Identifying economizer and power enrichment systems and describing the operation of the systems in float and pressure type carburetors (Level 2)
h. Identifying mixture controls incorporated in float and pressure carburetors and describing the operation of the system (Level 2)

TASK

PP-08 Repairing engine fuel metering system components (Level 2)

PERFORMANCE OBJECTIVE

Repair engine fuel metering system components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Inspecting fuel metering systems
b. Carburetor repairs and adjustments
c. Troubleshooting fuel metering devices
d. Float needle and seat
e. Float level

Provide Demonstration On:

a. Techniques of adjusting float level
b. Mechanic's privileges and limitations for fuel metering devices
c. Troubleshooting techniques for fuel metering devices

Provide Practical Application On:

a. Locating, removing, cleaning and reinstalling screens in fuel metering system components (Level 2)
b. Inspecting and describing the repair of carburetor floats (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants
c. Aviation Maintenance Publishers, Aircraft Fuel Metering System

A/Vs:

Aviation Maintenance Publishers, "Fuel Metering Systems," filmstrip EA-FMS

Tools and Equipment:

a. Aircraft engine installations with float type carburetors
b. Pressure carburetors
c. Fuel metering devices maintenance manuals
d. Hand tools
e. Carburetor special tools

LAB HOURS 3

CLASS HOURS 3

EVALUATION (PP-08)

a. Given an aircraft engine installation with a float type carburetor and the appropriate technical manuals, the learner will remove the carburetor, disassemble and inspect the needleseat assembly, adjust the float level to the required setting, inspect the inlet screen, reassemble and reinstall on the engine. All work must conform to manufacturer's specifications.

b. Given a pressure carburetor and the appropriate technical manuals, the learner will inspect the carburetor and describe its operational characteristics when impact tubes clog and when diaphragms are ruptured. Correct nomenclature and technical manual references must be without error.

c. Allen, National Study, Powerplant Curriculum, "Fuel Metering Systems."

d. Acme, Powerplant Mechanic.

e. Acme, Practical Test, Powerplant Test Subjects.

f. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

c. Inspecting float, needle and seat, and measuring and adjusting the float level of a carburetor (Level 2)
d. Inspecting a pressure type carburetor and describing operation resulting from clogged impact tubes and ruptured diaphragms (Level 2)

TASK

PP-09 Inspecting, checking and servicing water injection systems (Level 1)

PERFORMANCE OBJECTIVE

Identify and describe water injection systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Water injection system for reciprocating engines
b. Turbine engine water injection system
c. Causes and effects of detonation
d. Reducing detonation
e. Technical references for water injection systems

Provide Demonstration On:

Water injection operation for both piston and turbine engines

Provide Practical Application On:

Locating information regarding the inspection, checking and servicing of water injection systems (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

Tools and Equipment:

a. Aircraft maintenance manuals
b. Engine overhaul and maintenance manuals
c. ADI components

LAB HOURS 0

CLASS HOURS 2

EVALUATION (PP-09)

a. Given the appropriate technical manuals, the learner will locate the required inspection, checking and servicing data for a water injection system. Technical references and nomenclature used must be 100% accurate.

b. Allen, National Study, Powerplant Curriculum, "Fuel Metering Systems."

c. Acme, Powerplant Mechanic.

d. Acme, Practical Test, Powerplant Test Subjects.

e. FAA, AC65-22, Powerplant Written Test Guide.

TASK

PP-10 Inspecting, checking, troubleshooting, servicing and repairing engine ice and rain control systems (Level 2)

PERFORMANCE OBJECTIVE

Inspect, check, troubleshoot, service and repair engine ice and rain control systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Reciprocating engine induction systems
b. Induction system icing
c. Pre-heater and fluid deicing
d. Turbine engine induction systems
e. Turbine engine anti-icing systems

Provide Demonstration On:

a. Icing dangers
b. Operation of carburetor heat system
c. Turbine engine bleed air anti-icing system operation

Provide Practical Application On:

a. Describing induction icing and identifying probable location (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

Tools and Equipment:

a. Aircraft piston engine installation with induction ice and rain control system
b. Turbine engine installation with induction ice and rain control system
c. Aircraft maintenance manuals
d. Engine overhaul and maintenance manuals
e. Hand tools

LAB HOURS 2½

CLASS HOURS 2

EVALUATION (PP-10)

a. Given an aircraft piston engine installation equipped with induction ice and rain control and the appropriate technical manuals, the learner will inspect, check, service and repair induced discrepancies to the carburetor heat device and its attached parts. He/she will describe induction icing and the probable locations for piston engine induction systems. All work must be to manufacturer's specifications. Correct nomenclature must be used in description.

b. Given a turbine engine installation equipped with thermal anti-icing and the appropriate technical manuals, the learner will describe turbine induction icing, identify the probable icing locations and describe the operation of thermal anti-icing without error.

c. Allen, National Study, Powerplant Curriculum, "Induction Systems."

d. Acme, Powerplant Mechanic.

e. Acme, Practical Test, Powerplant Test Subjects.

f. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

b. Inspecting, checking, servicing and repairing a carburetor pre-heat system or hot spot (Level 2)
c. Describing the operation of thermal anti-icing systems for turbine engine air intakes (Level 2)

TASK

PP-11 Inspecting, checking, servicing and repairing heat exchangers and superchargers (Level 2)

PERFORMANCE OBJECTIVE

Operate, inspect and describe methods of repair for heat exchangers and superchargers.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Purpose of supercharging
b. Internally driven superchargers
c. Externally driven superchargers
d. Turbosupercharger system for large reciprocating engines
e. Turbocharger vs. supercharger
f. Sea level boosted turbocharger system
g. Induction heat exchangers
h. Start and operate the engine

Provide Demonstration On:

a. Engine starting and running
b. Internal supercharger drive train
c. Operation of turbocharger and its controls
d. Intercooler operation

Provide Practical Application On:

a. Inspecting and describing repair methods of superchargers (Level 2)
b. Inspecting, servicing and checking a supercharger system (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

A/Vs:

Cessna Aircraft Company, "Turbo System Powerplants," filmstrip SPA 72256-19

Tools and Equipment:

a. Aircraft engine equipped with a turbocharger
b. Engine cut-away with two stage supercharger or mock-up
c. Intercooler or heat exchanger
d. Aircraft maintenance manuals
e. Engine overhaul manuals
f. Hand tools
g. Special tools

LAB HOURS 3½

CLASS HOURS 4

EVALUATION (PP-11)

a. Given an operable engine installation equipped with a turbocharger and its controlling mechanisms and appropriate technical manuals, the learner will demonstrate inspection, servicing and checking procedures and will relate the operation sequence of the assembly. Procedures will be in accordance with applicable technical manuals and correct nomenclature will be used.

b. Given an engine cut-away containing a two speed internal supercharger or a mockup and appropriate technical manuals, the learner will identify the impeller and its complete drive train and control. Inspection, servicing and checking procedures will be identified and related. Repair procedures will be located and their application to the system will be related. Procedures will be in accordance with applicable technical manuals and correct nomenclature will be used.

c. Given an intercooler and the appropriate technical manual, the learner will inspect the unit for airworthiness and will relate the approved methods of repair. Procedures will be in accordance with applicable technical manuals and correct nomenclature will be used.

d. Allen, National Study, Powerplant Curriculum, "Induction Systems."

e. Acme, Powerplant Mechanic.

f. Acme, Practical Test, Powerplant Test Subjects.

g. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

c. Inspecting heat exchanger and describing methods of repair (Level 2)
d. Starting and running the engine (Level 2)

TASK

PP-12 Inspecting, checking, servicing and repairing carburetor air intake and induction manifold (Level 3)

PERFORMANCE OBJECTIVE

Operate engine and inspect, check, service and repair the carburetor air intake and induction manifold.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Induction systems
b. Induction manifolds
c. Alternate air sources
d. Air screen and filters
e. Ram air ducts
f. Inspecting ducts
g. Repairing ducts
h. Carburetor heater
i. Inspecting carburetor heaters
j. Carburetor screens and air filters
k. Engine priming systems

Provide Demonstration On:

a. Inspection techniques for induction manifolds
b. Inspecting and rigging carburetor heat box
c. Inspection and servicing inlet air screens
d. Inspecting and repairing primary system

Provide Practical Application On:

a. Inspecting, checking, servicing and repairing an air intake duct for a carbureted engine (Level 3)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

Tools and Equipment:

a. Aircraft engine installation with complete induction system
b. Aircraft maintenance manual
c. Hand tools

LAB HOURS 4

CLASS HOURS 2½

EVALUATION (PP-12)

a. Given an operational engine with a complete induction system and appropriate technical manuals, the learner will inspect, check and service the entire induction system. The learner will repair a defective induction hose or seal, a maladjusted carburetor heat valve and a defective priming system. All defects will be noted and work performed must be in accordance with applicable technical manuals.

b. Allen, National Study, Powerplant Curriculum, "Induction Systems."

c. Acme, Powerplant Mechanic.

d. Acme, Practical Test, Powerplant Test Subjects.

e. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

b. Inspecting, checking, servicing and repairing a carburetor heater system (Level 3)
c. Inspecting and servicing air screens or air filters in the engine air intake (Level 3)
d. Inspecting, checking and servicing engine primer systems (Level 3)

TASK

PP-13 Inspecting, checking, troubleshooting, servicing and repairing engine cooling systems (Level 3)

PERFORMANCE OBJECTIVE

Operate the engine and inspect, check, troubleshoot, service and repair engine cooling systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Reciprocating engine cooling systems
b. Inspection of cowling
c. Turbine engine cooling
d. Cowl flaps
e. Baffles
f. Augmentors
g. Effects of fuel/air ratio on cooling
h. Effects of engine timing on cooling

Provide Demonstration On:

a. Inspecting and adjusting cowl flaps
b. Operation of augmentors
c. Cooling airflow through turbine engine
d. Engine operation

Provide Practical Application On:

a. Inspecting, checking and servicing engine cooling systems (Level 3)
b. Troubleshooting and repairing engine cooling systems (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

Tools and Equipment:

a. Live aircraft with piston engine
b. Aircraft maintenance manual
c. Turbine engine
d. Engine maintenance manual
e. Hand tools
f. Special tools

LAB HOURS 4

CLASS HOURS 3

EVALUATION (PP-13)

a. Given an aircraft with cowl flaps and/or augmentors and the appropriate technical manuals, the learner will inspect, check and service the engine cooling system in accordance with approved means. All defects will be noted and corrected according to applicable technical manuals.

b. Given a turbine engine and the appropriate technical manuals, the learner will trace and relate engine cooling airflow and will demonstrate allowable inspection, checking and servicing procedures. Correct technical references and nomenclature will be used.

c. Given both reciprocating and turbine engines with induced or mock cooling system troubles and appropriate technical manuals, the learner will troubleshoot each and repair. All repairs will be in accordance with applicable technical manuals.

d. Allen, National Study, Powerplant Curriculum, "Engine Cooling Systems."

e. Acme, Powerplant Mechanic.

f. Acme, Practical Test, Powerplant Test Subjects.

g. FAA, AC65-22, Powerplant Written Test Guide.

TASK

PP-14 Repairing engine cooling system components (Level 2)

PERFORMANCE OBJECTIVE

Repair engine cooling system components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Engine cylinder cooling fin inspection and repair
b. Engine baffle and cowling inspection and repair

Provide Demonstration On:

a. Repairing broken cylinder fins
b. Aluminum repair procedures

Provide Practical Application On:

Repair baffles and reprofile cylinder fins (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Powerplants

Tools and Equipment:

a. Cylinders with defective fins
b. Cracked baffles and/or cowling
c. Sheet metal tools
d. Hand tools
e. Engine maintenance manual
f. Aircraft maintenance manual

LAB HOURS 2½

CLASS HOURS ½

EVALUATION (PP-14)

a. Given an aircraft cylinder with defective fin area and a cracked baffle and/or cowling and appropriate repair data, the learner will reprofile the cylinder fin and repair the baffle and/or cowling to meet AC43.13-1A specifications.

b. Allen, National Study, Powerplant Curriculum, "Engine Cooling Systems."

c. Acme, Powerplant Mechanic.

d. Acme, Practical Test, Powerplant Test Subjects.

e. FAA, AC65-22, Powerplant Written Test Guide.

TASK

PP-15 Inspecting, checking, troubleshooting, servicing and repairing engine exhaust systems (Level 3)

PERFORMANCE OBJECTIVE

Inspect, check, troubleshoot, service and repair engine exhaust systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Reciprocating engine exhaust systems
b. Reciprocating engine exhaust system maintenance practices
c. Turbine engine exhaust ducts
d. Turboprop exhaust systems
e. Thrust reversers
f. Noise suppressors
g. Turbocompound engines
h. Turbocharged engines
i. Exhaust heaters (cabin)
j. Inspection of exhaust heater
k. Power recovery turbines (PRT)

Provide Demonstration On:

a. Exhaust system inspection and repair techniques for both piston and turbine
b. Turbocompound principles
c. Turbocharger operation

Provide Practical Application On:

a. Inspecting, removing, replacing, adjusting and repairing joints in exhaust systems (Level 3)
b. Inspecting, removing and reinstalling exhaust heaters (Level 3)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Powerplants

Tools and Equipment:

a. Piston engine installation with exhaust system utilizing an exhaust heater
b. Turbocharger installation
c. Power recovery turbine installation, mockup or schematic
d. Turbine thrust reverser and noise suppressor installation, mockup or schematic
e. Hand tools
f. Aircraft maintenance manual

LAB HOURS 7

CLASS HOURS 6

EVALUATION (PP-15)

a. Given two engine installations, one with a short stack exhaust system and the other with a collector exhaust system and the appropriate technical manuals, the learner will inspect, remove, replace, adjust and repair exhaust joints and heaters. All work must be in accordance with AC43.13-1A.

b. Given two engine installations, one with a turbocharger and the other with power recovery turbines or mockups and appropriate technical manuals, the learner will identify components, relate inspection procedures and describe the operating principles of each. Technical references and nomenclature used must be 100% accurate.

c. Given a jet engine thrust reverser installation, a noise suppressor installation or mockups and the appropriate technical manuals, the learner will describe the operation of each and relate inspection procedures applicable to both. Technical references and nomenclature used must be 100% accurate.

d. Allen, National Study, Powerplant Curriculum, "Engine Exhaust Systems."

e. Acme, Powerplant Mechanic.

f. Acme, Practical Test, Powerplant Test Subjects.

g. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

c. Identifying, inspecting and describing the operation of turbosuperchargers and turbocompound engines (Level 2)

d. Describing the operation and inspection of jet engine thrust reversers and noise suppressors (Level 2)

TASK

PP-16 Repairing engine exhaust system components (Level 2)

PERFORMANCE OBJECTIVE

Describe repair procedures for exhaust system components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Inspection and repair of welded exhaust components
b. Materials used
c. Limitations of using oxy-acetylene welding
d. Using inert gas welding techniques

Provide Demonstration On:

Identifying exhaust system component material

Provide Practical Application On:

Recognizing materials used in exhaust system components and describing repair procedures (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Powerplants

Tools and Equipment:

a. Exhaust manifolds
b. Mufflers
c. Exhaust pipes
d. Muffler shrouds
e. Aircraft maintenance manuals

LAB HOURS 2

CLASS HOURS 2

EVALUATION (PP-16)

a. Given various aircraft engine exhaust components and the appropriate technical manuals, the learner will recognize the components and determine material type. A description of repair procedures for each will be done using correct technical references and nomenclature.

b. Allen, National Study, Powerplant Curriculum, "Engine Exhaust Systems."

c. Acme, Powerplant Mechanic.

d. Acme, Practical Test, Powerplant Test Subjects.

e. FAA, AC65-22, Powerplant Written Test Guide.

TASK

PP-17 Overhauling magneto and ignition harness (Level 2)

PERFORMANCE OBJECTIVE

Overhaul magneto and ignition harness.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Reciprocating engine ignition system
b. Magneto ignition system operating principles
c. Checking the internal timing of a magneto
d. Reciprocating engine ignition system maintenance and inspection
e. Ignition harness
f. Magneto components
g. Inspection of breakers assembly

Provide Demonstration On:

a. Overhaul and testing procedures for magnetos
b. Installation of ignition harness

Provide Practical Application On:

a. Disassembling, identifying, components and reassembling a magneto (Level 2)
b. Inspecting and selecting serviceable magneto breaker assemblies (Level 2)
c. Internally timing a magneto (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-15A: Airframe Handbook
b. McGraw-Hill, Aircraft Powerplants
c. Aviation Maintenance Publishers, Aircraft Ignition and Electrical Power Systems

A/Vs:

(Continued on back)

Tools and Equipment:

a. Magneto with impulse coupling
b. Magneto overhaul tools
c. Magneto overhaul manual
d. Magneto test stand
e. Ignition harness
f. Engine installation
g. Hand tools
h. Special tools

LAB HOURS 15

CLASS HOURS 15

EVALUATION (PP-17)

a. Given an aircraft magneto with an impulse coupling and the appropriate overhaul tools and data, the learner will completely disassemble the magneto, inspect and test each part, compile a parts list, reassemble to the proper degree and test it for performance. All work must be in accordance with the manufacturer's instructions and FFA directives.

b. Given an aircraft ignition harness and an engine to install it on, the learner will properly install the harness in compliance with the manufacturer's instructions.

c. Allen, National Study, Powerplant Curriculum, "Ignition Systems."

d. Acme, Powerplant Mechanic.

e. Acme, Practical Test, Powerplant Test Subjects.

f. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

d. Installing high tension leads (Level 2)
e. Assembling, operating and disassembling an impulse coupling on a magneto (Level 2)

INSTRUCTIONAL MATERIALS

A/Vs:

a. Aviation Maintenance Publishers, "Aircraft Ignition Systems," filmstrip EA-IGS and "Slick Magnetos," filmstrip EA-SEM
b. Cessna Aircraft Co., "Magneto - 600/4000 Series," filmstrip SPA 71251-19

TASK

PP-18 Inspecting, checking, servicing, troubleshooting and repairing reciprocating and turbine engine ignition systems (Level 3)

PERFORMANCE OBJECTIVE

Inspect, check, service, troubleshoot and repair reciprocating and turbine engine ignition systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Auxiliary ignition units (boosters)
b. Spark plugs
c. Magneto ignition timing devices
d. Spark plug inspection and maintenance
e. The engine analyzer
f. Turbine engine ignition systems
g. Ignition system inspection and maintenance
h. Ignition switches
i. Ignition harness tester

Provide Demonstration On:

a. Magneto to engine timing
b. Testing an ignition harness
c. Spark plug maintenance techniques
d. Turbine ignition system maintenance
e. Ignition analyzer operation

Provide Practical Application On:

a. Inspecting, checking, troubleshooting, removing and reinstalling wiring to an ignition switch (Level 3)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

A/Vs:

a. Aviation Maintenance Publishers, "AC Sparkplug Care," filmstrip EA-SPC and "Time-Rite Indicator," filmstrip EA-TRI
b. Cessna Aircraft Company, "Spark Plug and Combustion Analysis," filmstrip SPA-69283-19

Tools and Equipment:

a. Complete piston engine installation
b. Complete turbine engine installation
c. Spark plug maintenance and test equipment
d. Magneto to engine timing equipment
e. Harness tester
f. Ignition boost devices

(Continued on back)

LAB HOURS 20

CLASS HOURS 12

EVALUATION (PP-18)

a. Given a piston engine installation and the appropriate technical tools and manuals, the learner will remove, inspect and reinstall both magnetos, test the ignition harness for shorts and condition and remove, inspect, recondition, test and reinstall all spark plugs. All work must be in accordance with manufacturer's specifications and appropriate technical manuals.

b. Given a piston engine installation, the learner will remove, inspect, check, troubleshoot and reinstall the ignition switch and primary leads. All work must be in accordance with manufacturer's specifications.

c. Given an ignition booster system and the appropriate technical data, the learner will demonstrate proper installation, inspection, operation, troubleshooting and repair procedures. Demonstration must be in accordance with applicable technical manuals.

d. Given ten sample engine analyzer patterns and the appropriate operators handbook, the learner will identify, compare and interpret the patterns. Eight of the ten patterns must be interpreted correctly.

e. Given a piston engine installation and a turbine engine installation and the appropriate technical manuals, the learner will compare and describe five differences between the two engine's ignition systems and applicable safety precautions. Technical references and nomenclature used must be 100% accurate.

f. Allen, National Study, Powerplant Curriculum, "Ignition Systems."

g. Acme, Powerplant Mechanic.

h. Acme, Practical Test, Powerplant Test Subjects.

i. FAA, AC65-22, Powerplant Written Test Guide.

Task PP-18

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

b. Using an ignition harness tester to identify a shorted lead on an engine (Level 3)
c. Installing, inspecting, operating, troubleshooting and repairing an ignition booster system (Level 3)
d. Removing, inspecting, reconditioning, testing and reinstalling spark plugs (Level 3)
e. Timing magnetos to engine (Level 3)
f. Identifying, comparing and interpreting ignition analyzer patterns (Level 2)
g. Comparing and describing the differences between piston engine and turbine engine ignition systems (Level 2)

INSTRUCTIONAL MATERIALS

Tools and Equipment:

g. Manufacturer's maintenance manuals
h. Engine analyzer handbook
i. Special tools

TASK

PP-19 Repairing engine ignition system components (Level 2)

PERFORMANCE OBJECTIVE

Bench test magnetos, ignition coils, primary leads and condensers.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

Removal, maintenance and installation of ignition system components
1. Magnetos
2. Ignition coils
3. Primary leads
4. Condensers

Provide Demonstration On:

a. Magneto test bench operation
b. Operation of magneto component test equipment
c. Analyzing ignition lead faults

Provide Practical Application On:

a. Operating and testing a magneto on a test bench (Level 2)
b. Testing and judging the serviceability of condensers (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

A/Vs:

Aviation Maintenance Publishers, "Constructing an Ignition Lead," video tape ITPS-121 and "Replacing the Slick Magneto," video tape ITPS-122

Tools and Equipment:

a. Operable magneto
b. Magneto test bench
c. Assorted magneto condensers
d. Magneto high tension coil
e. Magneto component testers
f. Operable piston engine
g. Magneto maintenance manual
h. Engine operations manual
i. Hand tools
j. Special tools

LAB HOURS 14

CLASS HOURS 14

EVALUATION (PP-19)

a. Given an operable magneto, a magneto test bench and the appropriate technical manuals, the learner will install and test the magneto on the test stand in accordance with the manufacturer's maintenance manual. All work must be within manufacturer's specifications and determination of condition must be based on appropriate data.

b. Given three magneto capacitors and a magneto high tension coil, the proper test equipment and the appropriate technical data, the learner will test and determine serviceability of each. Test results must equal known conditions of components.

c. Given an operable piston engine installation with a faulty high tension ignition lead, the learner will operate the engine, determine the apparent fault, test the system and repair the faulty lead. Determination of fault must be 100% correct and repair must be according to manufacturer's specifications.

d. Allen, National Study, Powerplant Curriculum, "Ignition Systems."

e. Acme, Powerplant Mechanic.

f. Acme, Practical Test, Powerplant Test Subjects.

g. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

c. Using a coil tester to test ignition coils (Level 2)
d. Demonstrating the effect of faults in an ignition lead and correcting the fault (Level 2)

TASK

PP-20 Installing, checking and servicing engine electrical wiring, controls, switches, indicators and protective devices (Level 3)

PERFORMANCE OBJECTIVE

Install, check and service engine electrical wiring, controls, switches, indicators and protective devices.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Powerplant electrical systems
b. Lacing and typing wire bundles
c. Cutting and stripping wire and cable
d. Emergency splicing repairs
e. Connecting terminal lugs to terminal blocks
f. Bonding and grounding
g. Connectors
h. Conduit
i. Electrical equipment installation
j. Troubleshooting electrical systems
k. Circuit protection
l. Switches
m. Using wiring selection charts

Provide Demonstration On:

a. Determining electrical installation requirements and techniques
b. Using wire and circuit protective charts

Provide Practical Application On:

a. Identifying types, purposes, applicability and operation of electrical fuses, circuit breakers and switches (Level 1)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles

Tools and Equipment:

a. Various basic electrical circuit
b. Quick disconnectors
c. Solenoids
d. Electrical wiring mockup
e. Electrical wiring tools
f. Hand tools
g. Multimeter

LAB HOURS 19½

CLASS HOURS 18½

EVALUATION (PP-20)

a. Given an electrical component for installation, a schematic diagram to be followed and the necessary required circuit components, the learner will select and identify the correct electrical cable, switch and circuit breaker for the installation. He/she will demonstrate proper wiring and installation techniques by performing the actual installation. The installation shall include the use of terminals, splices and bonding jumpers. All work must be in accordance with AC43.13-1A and appropriate technical manuals.

b. Given electrical circuit situations, the learner will locate and describe FFA requirements pertaining to
   1. Selection of fuses, circuit breakers and switches for electrical circuits
   2. Installation requirements and characteristics for electrical wiring systems and junction boxes
   3. Use of quick-disconnect electrical connectors
   4. Selection of aircraft grade wire for high and low tension application

   Description must include use of correct nomenclature and technical references. All FFA requirements must be identified.

c. Given an electrical relay and required circuit components, the learner will design and build the relay circuit and test for proper operation. He/she will determine the causes and effects of induced relay chatter. One hundred percent accuracy is required.

d. Allen, National Study, Powerplant Curriculum, "Engine Electrical Systems."

e. Acme, Powerplant Mechanic.

f. Acme, Practical Test, Powerplant Test Subjects.

g. FAA, AC65-22, Powerplant Written Test Guide.

Task PP-20

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

b. Selecting and installing aircraft electrical switches and wiring to engine electrical components (Level 3)
c. Determining installation requirements and characteristics for aircraft electrical wiring systems and junction boxes (Level 1)
d. Installing electrical terminals, splices and bonding jumpers and identifying aircraft electrical cables (Level 3)
e. Using quick-disconnect electrical connectors and characteristics of high and low tension electrical wire (Level 1)
f. Installing and wiring solenoid operated switches and determining causes and effects of solenoid switch chatter (Level 2)

TASK

PP-21 Repairing engine electrical system components (Level 2)

PERFORMANCE OBJECTIVE

Repair engine electrical system components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. D.C. generators and voltage regulation
b. A.C. generators and voltage regulation
c. Paralleling generators
d. Locating information in service manuals and parts catalogs
e. Calculating total electrical load
f. Electric solenoid operated pneumatic valves

Provide Demonstration On:

a. Performing a load check
b. Troubleshooting generator systems
c. Troubleshooting electrical circuits

Provide Practical Application On:

a. Using service manuals and parts catalogs to locate procedures for repair or replacement of engine electrical system components and to obtain part numbers for replacement parts (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Electricity and Electronics for Aerospace Vehicles

A/Vs:

Prestolite Corp., "Prestolite Alternators" filmstrip

Tools and Equipment:

a. Alternators
b. D.C. generators
c. Manufacturer's maintenance manuals
d. Dual D.C. generator mockup or multi engine aircraft with generators
e. Live aircraft with electrical system or mockup
f. Sensitive ammeter
g. Multimeter
h. Hand tools
i. Generator test equipment

LAB HOURS 8½

CLASS HOURS 11

EVALUATION (PP-21)

a. Given an aircraft alternator and a D.C. generator, proper test equipment and the appropriate technical manuals, the learner will locate correct overhaul techniques for each. A parts list will be compiled indicating standard replacement items for defective items. The task shall be completed without error and correct nomenclature will be used.

b. Given a multi engine aircraft with dual D.C. generators or a mockup and the appropriate technical data, the learner will check, troubleshoot and repair induced system troubles. All work will be in accordance with specifications provided.

c. Given a live aircraft with a generator or alternator electrical system and a sensitive ammeter, the learner will determine the approximate, actual and permissible continuous electrical load of the aircraft. Total load and maximum permissable load will be determined with less than 20% error.

d. Given an operable electrical system, the appropriate technical data and a multimeter, the learner will inspect, check and repair induced problems in a solenoid operated component. All problems will be identified and corrected in accordance with specifications provided.

e. Allen, National Study, Powerplant Curriculum, "Engine Electrical Systems."

f. Acme, Powerplant Mechanic.

g. Acme, Practical Test, Powerplant Test Subjects.

h. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

b. Checking, troubleshooting and repairing an aircraft dual D.C. generator electrical system (Level 2)
c. Determining approximate, actual, and permissable continuous load on an aircraft electrical generating system (Level 2)
d. Inspecting, checking and repairing solenoid valves for engine pneumatic functions (Level 2)

TASK

PP-22 Inspecting, checking, servicing, troubleshooting and repairing engine temperature, pressure and RPM indicating systems (Level 3)

PERFORMANCE OBJECTIVE

Inspect, check, service, troubleshoot and repair engine temperature, pressure and RPM indicating systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Pressure instruments
b. Temperature gages
c. Tachometers
d. Fuel pressure warning systems
e. Fault indicating and isolating systems
f. Operating principles

Provide Demonstration On:

a. Identifying mechanic privileges and limitations for instruments
b. Basic operation of instrument indicating systems

Provide Practical Application On:

a. Identifying operating principles and installation practices of temperature indicating systems for aircraft engine instrumentation (Level 1)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Powerplants
d. Aviation Maintenance Publishers, Aircraft Instrument Systems

Tools and Equipment:

a. Aircraft engine installation with instrumentation
b. Various aircraft instrument cut-aways and required attachments
c. Aircraft maintenance manuals
d. Hand tools
e. Aircraft type certificate data sheets

LAB HOURS 7

CLASS HOURS 11

EVALUATION (PP-22)

a. Given temperature, manifold pressure, engine inlet and outlet temperature and pressure indicating and warning systems and the appropriate technical data, the learner will identify each system's purpose, operating principles, requirements, installation practices and troubleshooting procedures. Correct technical references and nomenclature will be used.

b. Given an operable engine tachometer system and the appropriate technical data, the learner will inspect, check, troubleshoot and repair induced problems in the tachometer system. All problems will be identified and repaired in accordance with applicable technical manuals.

c. Given a thermocouple and resistance/ratiometer temperature indicating systems and the appropriate technical data, the learner will check, troubleshoot and repair induced problems in the systems. All problems will be identified and repaired in accordance with applicable technical manuals.

d. Allen, National Study, Powerplant Curriculum, "Engine Instrument Systems."

e. Acme, Powerplant Mechanic.

f. Acme, Practical Test, Powerplant Test Subjects.

g. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

b. Checking, troubleshooting and repairing thermocouple and resistance/ratiometer temperature indicating systems (Level 3)

c. Identifying purposes, operating principles and troubleshooting techniques of manifold pressure indicating systems (Level 1)

d. Inspecting, checking, troubleshooting and repairing engine tachometer systems (Level 3)

e. Identifying purposes, operating principles, requirements and applications of engine inlet and outlet temperature indicating systems (Level 1)

f. Identifying purposes, operating principles and applications of pressure indicating and warning systems used with aircraft engines (Level 1)

TASK

PP-23 Troubleshooting, servicing and repairing fluid rate of fuel flow indicating systems (Level 2)

PERFORMANCE OBJECTIVE

Identify components and draw diagrams of fuel flow systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

Fuel flowmeter systems
1. Electrical
2. Mechanical
3. Turbine engine
4. Piston engine

Provide Demonstration On:

Demonstrating flowmeter operating principles

Provide Practical Application On:

Drawing diagrams of turbine and piston engine fuel flow systems

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-9A: General Handbook
b. McGraw-Hill, Aircraft Powerplants
c. Aviation Maintenance Publishers, Aircraft Instrument Systems

Tools and Equipment:

a. Fuel flowmeter system and components
b. Aircraft maintenance manual
c. Hand tools

LAB HOURS ½

CLASS HOURS 2

EVALUATION (PP-23)

a. Given a fuel flow indicating system, component parts and the appropriate technical manuals, the learner will draw a diagram and label components of turbine and piston engine fuel flow. Diagrams must show 75% of details identified in technical manuals and show correct flow pattern.

b. Allen, National Study, Powerplant Curriculum, "Engine Instrument Systems."

c. Acme, Powerplant Mechanic.

d. Acme, Practical Test, Powerplant Test Subjects.

e. FAA, AC65-22, Powerplant Written Test Guide.

TASK

PP-24 Inspecting, checking, servicing, troubleshooting and repairing engine fire detection and extinguishing systems (Level 3)

PERFORMANCE OBJECTIVE

Inspect, check, service, troubleshoot and repair engine fire detection and extinguishing systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Reciprocating engine fire protection systems
b. Fire zones
c. Fire extinguishing agents
d. Turbine engine fire protection systems
e. Typical multi-engine fire protection system
f. Fire detection system maintenance practices

Provide Demonstration On:

a. Operation of fire detection system types
b. Fire extinguishing agent types and precautions
c. Fire protection system maintenance techniques

Provide Practical Application On:

a. Inspecting, checking, troubleshooting and repairing engine fire detection systems (Level 3)
b. Inspecting, checking, servicing, troubleshooting and repairing engine fire extinguishing systems (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

Tools and Equipment:

a. Various fire detection system mockups and components
b. Aircraft with fire extinguishing system or mockup
c. Aircraft maintenance manual
d. Multimeter
e. Hand tools

LAB HOURS 2½

CLASS HOURS 2½

EVALUATION (PP-24)

a. Given two different operable fire detection systems and the appropriate technical manuals, the learner will identify and describe the operation, inspection, checking, troubleshooting and repair procedures applicable to both systems. Correct technical references and nomenclature will be used.

b. Given an aircraft equipped with an engine fire extinguishing system or mockup, the learner will identify and describe the operation, inspection, checking, servicing, troubleshooting and repairing procedures. Correct technical references and nomenclature will be used.

c. Allen, National Study, Powerplant Curriculum, "Engine Fire Protection Systems."

d. Acme, Powerplant Mechanic.

e. Acme, Practical Test, Powerplant Test Subjects.

f. FAA, AC65-22, Powerplant Written Test Guide.

TASK

PP-25 Inspecting, checking, servicing and repairing fixed-pitch, constant-speed and feathering propellers and propeller governing systems (Level 3)

PERFORMANCE OBJECTIVE

Inspect, check, service and repair fixed-pitch, constant-speed and feathering propellers and propeller governing systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Basic propeller principles
b. Propeller operation
c. Types of propellers
d. Classification of propellers
e. Propellers used on light aircraft
f. Constant speed propellers
g. Feathering
h. Hydromatic propellers
i. Hydraulic governors
j. Turboprop propellers
k. Blade cuffs

Provide Demonstration On:

a. Propeller types and operation of each
b. Identifying mechanic privileges and limitations for props
c. Propeller inspection and minor repairs
d. Propeller theory
e. Using propeller protractor

Provide Practical Application On:

a. Identifying and describing the forces acting on a propeller (Level 2)
b. Measuring propeller blade pitch angles (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Powerplants

A/Vs:

Aviation Maintenance Publishers, "Aircraft Propellers and Controls," filmstrip EA-APC

Tools and Equipment:

a. Aluminum propeller blades
b. Wooden propeller
c. Propeller protractor
d. Various propeller installations
e. Aircraft type certificates and data sheets
f. Aircraft maintenance manuals
g. Counter-weight propeller or mockup

(Continued on back)

LAB HOURS 9

CLASS HOURS 14

EVALUATION (PP-25)

a. Given counter-weight, hydromatic, non-counterweight feathering-reversing and turbine engine types of propellers and related components with technical schematics, the learner will describe the operation and control of each. Correct nomenclature will be used. All descriptions must be in accordance with technical references.

b. Given four propeller installations and appropriate reference books, the learner will identify the installed propellers and locate, interpret and relate type certificate requirements and "critical range" applicable to the propellers. At least three propellers will be correctly identified including locating type requirements and range.

c. Given a propeller, the learner will identify and describe the forces acting on it and their related stresses. Correct nomenclature will be used. All descriptions and identifications must be in accordance with technical references.

d. Given a propeller installation, a propeller protractor and the appropriate technical data, the learner will measure each blade's angle. Point of measurement must be in accordance with manufacturer's specifications. Measurement must be within ¼ degree.

e. Given a wooden propeller, the learner will inspect the tiping in accordance with approved methods and shall identify all defects without error.

f. Given an aluminum propeller blade with defects in the leading and tailing edges, the learner will repair the damage and describe the possible propeller failures that would occur should the damage remain. Defect repair must be to AC43.13-1A specifications. Description must be in accordance with technical references.

g. Allen, National Study, Powerplant Curriculum, "Propellers."

h. Acme, Powerplant Mechanic.

i. Acme, Practical Test, Powerplant Test Subjects.

j. FAA, AC65-22, Powerplant Written Test Guide.

Task PP-25

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

c. Locating and interpreting engine propeller "critical range" information (Level 2)
d. Locating and interpreting "static limit" information for fixed pitch propellers (Level 2)
e. Describing the operation and control by a counterweight propeller (Level 2)
f. Describing the operation and control of a hydromatic propeller (Level 2)
g. Describing the operation and control of non-counter weight variable pitch, feathering and reversing propeller (Level 2)
h. Describing the operation and control of a turbine engine propeller system (Level 2)
i. Inspecting and identifying probable location of defects in the metal tipping of propellers (Level 2)
j. Smoothing nicks, cuts and scratches in the leading and trailing edges of metal propeller blades (Level 3)

INSTRUCTIONAL MATERIALS

Tools and Equipment:

h. Hydromatic propeller or mockup
i. Non-counterweight feathering and reversing propeller or mockup
j. Turbine engine propeller system or mockup
k. Hand tools
l. Special tools

TASK

PP-26 Installing, troubleshooting and removing propellers (Level 3)

PERFORMANCE OBJECTIVE

Install, troubleshoot and remove propellers.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Propeller inspection and maintenance
b. Propeller vibration
c. Blade tracking
d. Checking and adjusting propeller blade angles
e. Propeller installation

Provide Demonstration On:

a. Engine-propeller operation checks
b. Installation and track of propeller types
c. Adjusting a propeller governor
d. Troubleshooting procedures for hydromatic propellers

Provide Practical Application On:

a. Checking operation of a full feathering and reversing propeller (Level 3)
b. Removing and installing a propeller on a tapered shaft (Level 3)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

A/Vs:

Aviation Maintenance Publishers, "Aircraft Propeller Care," video tape EA-APV

Tools and Equipment:

a. Operable engine equipped with a full feathering and reversing propeller or test stand operated propeller
b. Propellers installed on tapered and on splined shafts
c. Operation and installation manuals

(Continued on back)

LAB HOURS 13

CLASS HOURS 7½

EVALUATION (PP-26)

a. Given a propeller installed on a tapered shaft, a propeller installed on a spline shaft and the appropriate technical data, the learner will demonstrate removing and installing techniques and final tracking procedures for both installations. Demonstration must be in accordance with technical data.

b. Given an operable engine equipped with a full feathering and reversing propeller and the appropriate operations instructions, the learner will determine if the propeller operation is in conformity with applicable standards. Determination must be the same as known conditions.

c. Given an operable constant speed propeller installation and the appropriate technical data, the learner will operate the engine and adjust the governor to yield take-off RPM. Adjustment must be within given limits.

d. Given ten descriptions of faults applicable to a hydromatic propeller and the appropriate technical manuals, the learner will troubleshoot the propeller problems and associate the most probable cause with the condition. Seven of the ten problems must be correctly determined.

e. Allen, National Study, Powerplant Curriculum, "Propellers."

f. Acme, Powerplant Mechanic.

g. Acme, Practical Test, Powerplant Test Subjects.

h. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

c. Removing and installing a propeller on a splined shaft (Level 3)
d. Checking propeller track (Level 3)
e. Externally adjusting and rigging a propeller governor (Level 3)
f. Troubleshooting descriptions of faults in a hydromatic propeller (Level 3)

INSTRUCTIONAL MATERIALS

Tools and Equipment:

d. Constant speed propeller installation
e. Hydromatic propeller
f. Hand tools
g. Torque wrench
h. Special tools

TASK

PP-27 Inspecting, checking, servicing and repairing propeller synchronizing and ice control systems (Level 1)

PERFORMANCE OBJECTIVE

Identify and describe components and repair procedures for propeller synchronizing and ice control systems.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Propeller synchronization
b. Propeller ice control systems
c. Alcohol systems
d. Thermal systems

Provide Demonstration On:

a. Electric and alcohol propeller anti-icing system operation
b. Propeller synchronization system operation

Provide Practical Application On:

a. Identifying components and describing the operation of propeller anti-icing systems (Level 1)
b. Locating reference information and describing the operation of propeller synchronizing systems (Level 1)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

A/Vs:

Cessna Aircraft Co., "Automatic Propeller Synchronization," filmstrip SPA-67352-19

Tools and Equipment:

a. Propeller anti-icing system
b. Propeller synchronizing system and/or reference information

LAB HOURS	5
CLASS HOURS	8

EVALUATION (PP-27)

a. Given a propeller anti-icing, synchronization systems and the appropriate technical manuals, the learner will identify the component parts and describe the operation and control of the systems. All component parts will be identified. Description must include use of correct nomenclature and technical references.

b. Allen, National Study, Powerplant Curriculum, "Propellers."

c. Acme, Powerplant Mechanic.

d. Acme, Practical Test, Powerplant Test Subjects.

e. FAA, AC65-22, Powerplant Written Test Guide.

TASK

PP-28 Identifying and selecting propeller lubricants (Level 2)

PERFORMANCE OBJECTIVE

Identify and select propeller lubricants.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Servicing propellers
b. Proper lubricants
c. Centrifugal forces and propeller lubricants
d. Using manufacturer's specifications
e. Data sheets

Provide Demonstration On:

Propeller lubrication techniques

Provide Practical Application On:

Identifying the lubricant to service a specific propeller (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

A/Vs:

Aviation Maintenance Publishers, "Aircraft Propeller Care," video tape EA-APV

Tools and Equipment:

a. Moveable blade propellers
b. Aircraft service manuals
c. Propeller maintenance manuals
d. Selection of propeller lubricants

LAB HOURS 1

CLASS HOURS 1

EVALUATION (PP-28)

a. Given a propeller installation and the appropriate technical manuals, the learner will locate and relate acceptable lubricants and service techniques for the installed propeller. Selection of lubricant, nomenclature used and technical procedures cited must be 100% accurate.

b. Allen, National Study, Powerplant Curriculum, "Propellers."

c. Acme, Powerplant Mechanic.

d. Acme, Practical Test, Powerplant Test Subjects.

e. FAA, AC65-22, Powerplant Written Test Guide.

TASK

PP-29 Balancing propellers (Level 2)

PERFORMANCE OBJECTIVE

Describe the procedure for balancing propellers.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Static and dynamic propeller balance
b. Balancing fixed-pitch propellers
c. Balancing variable pitch propellers
d. Forces affecting balancing

Provide Demonstration On:

a. Using balancing equipment
b. Propeller balancing procedures

Provide Practical Application On:

Interpreting information and describing the procedure for balancing fixed-pitch and variable pitch propellers (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Powerplants

Tools and Equipment:

a. Fixed-pitch propellers
b. Variable pitched propellers
c. Propeller maintenance manuals
d. Propeller balancing equipment

LAB HOURS	4
CLASS HOURS	2½

EVALUATION (PP-29)

a. Given a fixed-pitch wooden propeller, a fixed-pitch aluminum propeller, a variable pitch propeller, suitable balancing equipment and appropriate technical information, the learner will check the static balance of each propeller and relate the proper corrective measures. Exact corrective measures must be identified for each condition.

b. Allen, National Study, Powerplant Curriculum, "Propellers."

c. Acme, Powerplant Mechanic.

d. Acme, Practical Test, Powerplant Test Subjects.

e. FAA, AC65-22, Powerplant Written Test Guide.

TASK

PP-30 Repairing propeller control system components (Level 2)

PERFORMANCE OBJECTIVE

Repair propeller control system components.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Hydraulic propeller governor operation and maintenance
b. Manual and electrical controls
c. Propeller pitch and engine RPM
d. Determining governor direction of rotation

Provide Demonstration On:

Governor action

Provide Practical Application On:

a. Describing the action of a propeller governor and the forces which control propeller pitch (Level 2)
b. Performing the operation necessary to match direction of governor rotation to the rotation of the engine drive (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants
c. Aviation Maintenance Publishers, Aircraft Propellers and Controls

A/Vs:

Aviation Maintenance Publishers, "Aircraft Propellers and Controls," filmstrip EA-APC

Tools and Equipment:

a. Propeller hydraulic single acting governor
b. Governor maintenance manual
c. Hand tools

LAB HOURS 5

CLASS HOURS 3

EVALUATION (PP-30)

a. Given a single acting hydraulic propeller governor and the appropriate technical manuals, the learner will disassemble the governor and relate the function and purpose of each component and adjustment procedures. Interpretation of information will be without error. Nomenclature and use of technical information must be 100% accurate.

b. Given an operable engine or mockup, a governor and appropriate information, the learner will match engine and governor rotation. One hundred percent accuracy is required.

c. Allen, National Study, Powerplant Curriculum, "Propellers."

d. Acme, Powerplant Mechanic.

e. Acme, Practical Test, Powerplant Test Subjects.

f. FAA, AC65-22, Powerplant Written Test Guide.

TASK

PP-31 Overhauling reciprocating engines (Level 2)

PERFORMANCE OBJECTIVE

Overhaul reciprocating engines.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Comparison of aircraft powerplants
b. Types of reciprocating engines
c. Reciprocating engine internal parts and mechanisms
d. Reciprocating engine operating principles
e. Operating cycles
f. Reciprocating engine power
g. Reciprocating engine overhaul
h. General overhaul procedures
i. Overhaul tools and equipment
j. Shop safety

Provide Demonstration On:

a. Construction features of opposed and radial aircraft engines
b. Displacement and compression ratio calculations
c. Engine operation principles
d. Valve timing
e. Engine overhaul practices and procedures

Provide Practical Application On:

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Powerplants

A/Vs:

(Continued on back)

Tools and Equipment:

a. Opposed type engine
b. Radial type engine
c. Engine cut-away with gear reduction mechanism
d. Radial engine component parts
e. Various engine special overhaul tools
f. Manufacturer's overhaul data
g. Airworthiness directives
h. Hand tools
i. Engine overhaul stand

LAB HOURS 80

CLASS HOURS 24

EVALUATION (PP-31)

a. Given an operable opposed aircraft engine, the necessary special tools, manufacturer's overhaul and parts data and mandatory FAA directives, the learner will overhaul the engine to a specified degree demonstrating proper techniques and care. He/she will identify each of the engines component parts and describe its function. Additionally, the learner will relate the principles of engine operation, methods of controlling engine efficiency, problems associated with high power operation, firing order determination and engine accessory drive speed and direction of rotation. Included in the overhaul the learner will list and explain all mandatory FAA directives, manufacturer's service bulletins and parts requirements. All work must be in accordance with AC43.13-1A and within manufacturer's specifications. All descriptions must use correct nomenclature and technical references.

b. Given a radial engine and various major component parts specifically different from opposed type engine parts and the appropriate technical information, the learner will identify and describe the parts and relate the operating principles involved. Correct nomenclature must be used.

c. Given an engine cut-away with propeller gear reduction mechanism, the learner will recognize and describe the operation of the reduction system. Correct nomenclature and technical references must be used.

d. Allen, National Study, Powerplant Curriculum, "Reciprocating Engines."

e. Acme, Powerplant Mechanic.

f. Acme, Practical Test, Powerplant Test Subjects.

g. FAA, AC65-22, Powerplant Written Test Guide.

Task PP-31

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

a. Explaining the principles of the Otto cycle (Level 2)
b. Using correct cylinder nomenclature (Level 2)
c. Identifying crankshaft and rod assemblies (Level 2)
d. Recognizing and classifying types of reciprocating engines (Level 1)
e. Recognizing and describing propeller reduction systems (Level 2)
f. Identifying nose and power cases and describing loads (Level 2)
g. Recognizing, identifying and describing function of valve springs (Level 1)
h. Identifying factors affecting volumetric effiency (Level 1)
i. Timing valves and explaining valve overlap (Level 2)
j. Identifying, cleaning and inspecting various types of bearings (Level 2)
k. Determining firing order of reciprocating aircraft engines (Level 2)
l. Determining direction of rotation and speed of engine accessory drives (Level 2)
m. Identifying and describing problems associated with high power operation (Level 1)
n. Preparation of a work station for overhaul of an engine (Level 2)
o. Overhauling a reciprocating engine (Level 2)

INSTRUCTIONAL MATERIALS

A/Vs:

Aviation Maintenance Publishers, "Aircraft Reciprocating Engines," filmstrip EA-ARE; "The Mechanics Tool Box," video tape ITPG-130 and "Shop Safety and Fire Protection," video tape ITPG-137

TASK

PP-32 Inspecting and repairing reciprocating engines (Level 2)

PERFORMANCE OBJECTIVE

Inspect and repair reciprocating engines.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Engine overhaul practices
b. Using precision measuring instruments
c. Component inspections
d. Non-destructive testing
e. Cylinder installation

Provide Demonstration On:

a. Dimensioning engine component parts
b. Using the manufacturer's table of limits
c. Magnetically inspecting engine parts

Provide Practical Application On:

a. Inspecting a cylinder (Level 2)
b. Detecting defects in crankcase assemblies (Level 2)
c. Removing and replacing a stud (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants
c. Aviation Maintenance Publishers, Aircraft Reciprocating Engines

A/Vs:

Aviation Maintenance Publishers, "Continental Cylinder Replacement," video tape ITP-S-103

Tools and Equipment:

a. Various engine parts and assemblies
b. Precision measuring equipment
c. Dye penetrant
d. Magnetic particles inspection equipment
e. Engine overhaul special tools
f. Engine overhaul and parts manuals
g. Hand tools

LAB HOURS 28

CLASS HOURS 15½

EVALUATION (PP-32)

a. Given an aircraft cylinder assembly, a crankcase, a crankshaft, a camshaft, a set of cam-followers and the appropriate technical manuals, the learner will inspect and use a non-destructive testing method to determine airworthiness. Determination must be 100% correct.

b. Given an engine crankcase, crankshaft and the appropriate technical manuals, the learner will determine the correct bearings for installation without error.

c. Given piston to rod combinations and articulated rods to master combinations and the appropriate technical data, the learner will identify, remove and reinstall the piston and knuckle pin retainers. Work must be to manufacturer's specifications.

d. Given a cylinder with valves, valve and valve seat grinding equipment and the proper technical instructions, the learner will grind the valves and seats to the proper specifications and install the valves within the seats to form the required seal. Cylinder valve leakage or compression must be within specifications. AC43.13-1A must be complied with.

e. Given an engine component with studs, the learner will demonstrate the proper procedure for removing and installing a stud. Removal and installation must be according to technical data and without stripping or breakage.

f. Given a cylinder assembly for installation and the correct technical manuals, the learner will install the assembly. Installation must be in accordance with manufacturer's specifications. No ring breakage is allowed.

g. Allen, National Study, Powerplant Curriculum, "Reciprocating Engines."

h. Acme, Powerplant Mechanic.

i. Acme, Practical Test, Powerplant Test Subjects.

j. FAA, AC65-22, Powerplant Written Test Guide.

Task PP-32

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

d. Selecting serviceable bearings (Level 2)
e. Dimensionally inspecting a crankshaft (Level 2)
f. Identifying, removing and reinstalling piston and knuckle pin retainers (Level 2)
g. Identifying and dimensionally inspecting cams and cam followers (Level 2)
h. Inspecting, refacing and reseating valves (Level 2)
i. Installing cylinder assembly on an engine (Level 2)

TASK

PP-33 Inspecting, checking, servicing and repairing opposed and radial engines and reciprocating engine installations (Level 3)

PERFORMANCE OBJECTIVE

Inspect, check, service and repair opposed and radial engines and reciprocating engine installations.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Block testing of reciprocating engines
b. Reciprocating engine operation and controls
c. Factors affecting engine operation
d. Valves and valve mechanisms
e. Cylinder compression and leakage tests
f. Desirable oil pressure
g. Oil dilution systems
h. Analyzing metal particles

Provide Practical Application On:

a. Checking and rigging cable operated and push-pull engine controls (Level 3)
b. Recognizing and identifying dynamic engine mounts (Level 1)
c. Recognizing unbalance and "critical vibration range" of propellers (Level 2)
d. Operating an engine at various power settings (Level 3)
e. Adjusting oil pressure (Level 3)
f. Checking operation of an oil dilution system (Level 3)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

A/Vs:

Aviation Maintenance Publishers, "Replacing the Slick Magneto," video tape ITPS-122; "Time-Rite Indicator," filmstrip EA-TRI

Tools and Equipment:

a. Engine installed on dynamic type mount
b. Engine installations
c. Operable engine installations
d. Differential compression and leakage testers
e. Radial engine
f. Aircraft with oil dilution system
g. Magneto timing equipment

(Continued on back)

LAB HOURS 30½

CLASS HOURS 20½

EVALUATION (PP-33)

a. Given an engine installation utilizing a dynamic type engine mount, the learner will identify the mount and relate five advantages over conventional mounts. Four advantages will be correctly identified.

b. Given an engine installation or installations, the learner will inspect all engine controls and rig both cable operated and push-pull operated devices. Work must be in accordance with manufacturer's specifications.

c. Given an operable engine and the appropriate technical data, the learner will start and operate the engine throughout all power ranges and will make all required checks for determining engine operation airworthiness. Additionally, a check for correct idle mixture and speed will be performed and the correct adjustment procedure for both will be demonstrated. The entire task is to be completed without error and in accordance with applicable technical manuals.

d. Given an operable engine, the learner will determine engine internal mechanical integrity by performing a differential compression test and an inspection of the oil screen and its content. Results of tests and inspections must equal known conditions.

e. Given an aircraft engine and the proper technical manuals, the learner will adjust the oil pressure to within manufacturer's specifications.

f. Given an operable engine and the appropriate technical data, the learner will install, time and test a magneto for proper performance. Timing must be within manufacturer's specifications. Test results must be equal to known conditions.

g. Given a radial engine and the appropriate technical manuals, the learner will remove and replace the cam plate, check for correct timing and adjust all valves without error. Valve adjustment must be within manufacturer's specifications. Timing check must be equal to known condition.

h. Given an aircraft with an oil dilution system and the proper technical data, the learner will check for proper operation. System check results must be equal to known conditions.

i. Given an engine installation and the appropriate technical manuals, the learner will determine the engine's "critical vibration range." Additionally, he/she will relate ten conditions which might result from propeller unbalance. Critical range identification must be 100% accurate. All ten conditions must be described using correct nomenclature and technical references.

Task PP-33

Evaluation

j. Allen, National Study, Powerplant Curriculum, "Reciprocating Engines."

k. Acme, Powerplant Mechanic.

l. Acme, Practical Test, Powerplant Test Subjects.

m. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

g. Performing an ignition check on an operating engine (Level 3)
h. Installing and timing a magneto to an engine (Level 3)
i. Adjusting idle speed and mixture on a carbureted engine (Level 3)
j. Performing a compression check of an engine (Level 2)
k. Adjusting valve clearance and making valve timing checks (Level 3)
l. Identifying the probable source of metal particles found in oil screens (Level 2)

INSTRUCTIONAL MATERIALS

Tools and Equipment:

h. Engine overhaul manual
i. Engine operation manual
j. Aircraft maintenance manual
k. Engine and propeller type certificate and data sheets

TASK

PP-34 Installing, troubleshooting and removing reciprocating engines (Level 3)

PERFORMANCE OBJECTIVE

Install, troubleshoot and remove reciprocating engines.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Safety
b. Engine installation
c. Preparing an engine for operation
d. Engine starting and operation procedures
e. Troubleshooting charts
f. Pre-oiling
g. Cylinder baffles
h. Operation of engine equipped with constant speed prop supercharger

Provide Demonstration On:

a. Engine installation techniques
b. Analyzing engine instrument read-outs
c. Operation of a constant speed propeller

Provide Practical Application On:

a. Lifting or hoisting an engine into an engine mount (Level 3)
b. Installing and removing a propeller from the propeller shaft (Level 3)
c. Pre-oiling of overhauled engines (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants

Tools and Equipment:

a. Operable engine installations
b. Pre-oiling equipment
c. Operable engine with constant speed propeller and/or supercharger
d. Engine overhaul manual
e. Engine operation manual
f. Hand tools

LAB HOURS 24½

CLASS HOURS 15½

EVALUATION (PP-34)

a. Given an operable aircraft and the appropriate technical data, the learner will remove the propeller and mount it on a stand and remove all baffles. He/she will reinstall the engine and all related components, connect all controls, perform engine pre-oiling, start the engine correctly and operate it to determine airworthiness of operation. All work must be to manufacturer's specifications and determination of airworthiness must equal known conditions.

b. Given an engine installation with full instrumentation, the learner will relate instrument readings that indicate operational distress. Readings must be within manufacturer's specifications and operating ranges.

c. Given an operable engine with a constant speed propeller and/or supercharger and the appropriate operations manual, the learner will demonstrate engine operation and checking procedure without error and in accordance with manufacturer's procedures.

d. Allen, National Study, Powerplant Curriculum, "Reciprocating Engines."

e. Acme, Powerplant Mechanic.

f. Acme, Practical Test, Powerplant Test Subjects.

g. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

d. Removing and reinstalling baffles (Level 2)
e. Demonstrating correct engine starting procedures (Level 3)
f. Recognizing symptoms that indicate operational distress (Level 2)
g. Operating an engine equipped with a constant speed propeller and/or supercharger

TASK

PP-35 Overhauling turbine engines (Level 2)

PERFORMANCE OBJECTIVE

Overhaul turbine engines.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Turbine engine construction
b. Types of turbine engines
c. Turbine operation principles
d. Turbine engine operation
e. Physics principles
f. Modular overhaul
g. Comparison of turboprop and reciprocating engines
h. Turbine compressors and blades
i. Diffusers
j. Combustion chambers
k. Thrust reversers

Provide Demonstration On:

a. Physics application of turbine operation
b. Identifying internal engine shape and components
c. Turbine engine run-up

Provide Practical Application On:

a. Illustrating Newton's law and the Brayton cycle (Level 2)
b. Explaining the relationship of RPM and thrust in a turbine engine (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants
c. Pratt and Whitney, Gas Turbine Engine
d. Aviation Maintenance Publishers, Aircraft Gas Turbine Powerplants

Student Manuals:

Aviation Maintenance Publishers, Aircraft Gas Turbine Powerplant Workbook

Tools and Equipment:

a. Turbine engine cut-away
b. Turbine engine schematics
c. Centrifugal compressor
d. Axial compressor
e. Turbofan schematic
f. Combustion chambers
   1. Can type
   2. Annulus type
   3. Can-annulus type
g. Turbine engine

(Continued on back)

LAB HOURS 10

CLASS HOURS 24

EVALUATION (PP-35)

a. Given a turbine engine cut-away or technical schematic and a line drawing, the learner will label the drawing, explain pressure changes in a turbine engine, the relationship of RPM and thrust in turbine engines, Newton's laws and the Brayton cycle and airflow in turbine engine diffusers. Correct terminology and nomenclature will be used to label the diagram and explain theories.

b. Given both types of turbine compressors, the learner will identify and explain the characteristics of each. Correct terminology and nomenclature must be used.

c. Given a schematic of a turbofan engine, the learner will identify the major components and explain airflow. All components must be identified. Airflow explanation must be in accordance with published data.

d. Given three types of combustion chambers or schematics, the learner will identify and relate the characteristics of each. Explanation must be in accordance with published data.

e. Given samples of impulse and reaction types of turbine blades and a mockup or schematic of a thrust reverser, the learner will identify and describe the basic operation. Correct terminology must be used. Explanation must be in accordance with published data.

f. Given technical data on both turboprop and reciprocating engines, the learner will compare and relate the basic characteristics of construction and operation of each with 70% accuracy.

g. Given a turbine engine and the appropriate overhaul tools and data, the learner will disassemble the engine to a specified degree, inspect each appointed section and reassemble the engine using the manufacturer's overhaul and inspection manuals. All work must be to manufacturer's specifications.

h. Given the appropriate technical data, the learner will describe modular overhaul. Explanation must be in accordance with published data.

i. Allen, National Study, Powerplant Curriculum, "Turbine Engines."

j. Acme, Powerplant Mechanic.

k. Acme, Practical Test, Powerplant Test Subjects.

l. FAA, AC65-22, Powerplant Written Test Guide.

Task PP-35

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

c. Identifying and explaining the characteristics of different turbine compressors (Level 2)
d. Identifying major components and explaining airflow in fan or by-pass turbine engines (Level 2)
e. Identifying pressure changes in turbine engines (Level 2)
f. Identifying airflow in diffusers (Level 2)

INSTRUCTIONAL MATERIALS

Tools and Equipment:

h. Impulse type turbine blades
i. Reaction type turbine blades
j. Engine overhaul manual
k. Hand tools
l. Special tools

TASK

PP-36 Inspecting, checking, servicing and repairing turbine engine installations (Level 2)

PERFORMANCE OBJECTIVE

Perform hot section injections.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Inspection and repair of turbine engines
b. Safety
c. Sequencing of work
d. Combustion chamber replacement
e. Fuel nozzle replacement

Provide Demonstration On:

a. Hot section inspection
b. Compressor inspection

Provide Practical Application On:

a. Removing, inspecting and installing a combustion case and liner (Level 2)
b. Disassembling, inspecting and reassembling compressor section of a turbine engine (Level 2)
c. Removing and installing a fuel nozzle in a turbine engine (Level 2)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants
c. Pratt and Whitney, Gas Turbine Engine

Tools and Equipment:

a. Turbine engine
b. Turbine engine special tools
c. Engine maintenance manual
d. Hand tools

LAB HOURS 5

CLASS HOURS 5

EVALUATION (PP-36)

a. Given a turbine engine and the appropriate tools and technical manuals, the learner will perform a hot section inspection and a compressor section inspection and shall include removal of the fuel nozzles. A description of airworthiness must be made equal to known condition. Fuel nozzle removal and replacement must be in accordance with manufacturer's specifications.

b. Allen, National Study, Powerplant Curriculum, "Turbine Engines."

c. Acme, Powerplant Mechanic.

d. Acme, Practical Test, Powerplant Test Subjects.

e. FAA, AC65-22, Powerplant Written Test Guide.

TASK

PP-37 Installing, troubleshooting and removing turbine engines (Level 2)

PERFORMANCE OBJECTIVE

Install, troubleshoot and remove turbine engines.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. Engine instrumentation
b. Turbine engine operation
c. Troubleshooting turbines
d. Turbine removal and installation
e. Engine fuel control trimming and adjustment
f. Overheat conditions
g. Effects of exhaust nozzle areas
h. Compressor surge
i. Causes for loss of performance

Provide Demonstration On:

a. Troubleshooting techniques for turbine engines
b. Trimming procedures
c. Inspection techniques for compressor and hot sections

Provide Practical Application On:

a. Identifying damaged turbine blades (Level 1)
b. Recognizing and identifying combustion chamber hot spots (Level 2)
c. Adjusting fuel control of turbine engines (Level 2)

(Continued on back)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. McGraw-Hill, Aircraft Powerplants
c. Pratt and Whitney, Gas Turbine Engine

Tools and Equipment:

a. Various damaged turbine blades
b. Thermally damaged hot section of turbine engine
c. Turbine engine installation
d. Turbine engine maintenance manual
e. Turbine engine operations manual
f. Special tools and test equipment
g. Hand tools

LAB HOURS 10½

CLASS HOURS 5

EVALUATION (PP-37)

a. Given serviceable and damaged turbine blades and appropriate inspection data, the learner will identify the damage and relate the possible causes. All damaged blades will be identified. Seventy percent of possible causes identified will be correct.

b. Given a thermally damaged combustion chamber assembly and appropriate inspection data, the learner will identify the hot spots and will relate the possible causes. All hot spots will be identified. Seventy percent of possible causes identified will be correct.

c. Given a turbine engine installation and the appropriate technical manuals, the learner will determine and explain the proper trimming procedure for the fuel control. Demonstration must be according to applicable technical manuals.

d. Given the appropriate technical data, the learner will determine and explain the causes for performance loss in turbines, compressor surge in turbines, the effects of exhaust nozzle area during turbine operation and turbine engine removal and installation procedures. Demonstration must be according to applicable technical manuals.

e. Allen, National Study, Powerplant Curriculum, "Turbine Engines."

f. Acme, Powerplant Mechanic.

g. Acme, Practical Test, Powerplant Test Subjects.

h. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL ACTIVITIES

Provide Practical Application On:

d. Recognizing the effects of exhaust nozzle area (Level 1)
e. Identifying compressor surge (Level 1)
f. Identifying causes for performance loss (Level 1)
g. Removal and installation of turbine engine (Level 1)

TASK

PP-38 Performing powerplant conformity and airworthiness inspection (Level 3)

PERFORMANCE OBJECTIVE

Perform powerplant conformity and airworthiness inspection.

INSTRUCTIONAL ACTIVITIES

Provide Information On:

a. FAA inspection requirements
b. Engine inspection procedure
c. Maintenance record entries and forms
d. Airworthiness directives
e. Inspection checklists

Provide Demonstration On:

a. 100 hour and annual inspection - scope and detail
b. Log book entries
c. Major repair and alteration form use

Provide Practical Application On:

a. Inspecting an engine for compliance with airworthiness directives (Level 3)
b. Inspecting an engine for conformity with specifications (Level 3)

INSTRUCTIONAL MATERIALS

Textbooks:

a. FAA, AC65-12A: Powerplant Handbook
b. FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair
c. McGraw-Hill, Aircraft Powerplants
d. Aviation Maintenance Publishers, Federal Aviation Regulations Handbook for Aviation Mechanics

Tools and Equipment:

a. Engine installed on aircraft
b. Airworthiness directives
c. Aircraft type certificate and data sheets
d. Engine and propeller type certificate and data sheets
e. Engine service bulletins
f. Engine maintenance manual
g. Inspection checklist
h. Hand tools

A/Vs:

(Continued on back)

LAB HOURS 7

CLASS HOURS 3

EVALUATION (PP-38)

a. Given a powerplant installed on an aircraft, an inspection checklist and the appropriate technical data, the learner will perform a 100 hour/annual inspection on the powerplant and will compile a sample log book entry to reflect the completed inspection. Determination whether airworthiness directives and required maintenance have been compiled with must be 100% accurate.

b. Allen, National Study, Powerplant Curriculum, "Engine Inspection."

c. Acme, Powerplant Mechanic.

d. Acme, Practical Test, Powerplant Test Subjects.

e. FAA, AC65-22, Powerplant Written Test Guide.

INSTRUCTIONAL MATERIALS

A/Vs:

Aviation Maintenance Publishers, "Aircraft 100 Hour/Annual Inspections," filmstrip EA-HAS and "Inspection and Maintenance Records," filmstrip EA-IAR

SECTION IV

CURRICULUM STRUCTURE, EXIT POINTS & COURSE OUTLINE

SECTION IV

Section IV Content List

Introduction to the Curriculum Structure
Curriculum Structure
  Group
  Individualized
Introduction to Aviation Mechanics Exit Points
Aviation Mechanics Exit Points
  Group
  Individualized
Introduction to the Course Outline
Course Outline

Section III presented a sample organizational model for sequencing the instruction of program tasks. Based on that model, Section IV provides suggested methods of structuring the entire Aviation Mechanics curriculum.

INTRODUCTION TO THE CURRICULUM STRUCTURE

A curriculum structure is developed by sequencing duties* into a logical teaching plan. Two curriculum structures are presented in this section - group and individualized.

The group designed structure is based on recommendations of David Allen's, National Study and other programs across the United States. The required 1900 hours is distributed over six quarters assuming that each quarter is approximately 317 hours.

The individualized structure also lists the duty areas under major blocks, but does not include hours or quarters. Using the individualized approach, the student proceeds at his or her pace until each task is mastered.

In either type of structure, the duty areas and major blocks can be re-arranged to meet local needs, however, the FAA should be consulted before restructuring any approved curriculum.

*Duties are large segments of work done by an individual and usually require several tasks to accomplish. They are generally grouped under the major teaching blocks of the program.

AVIATION MECHANICS SUGGESTED CURRICULUM STRUCTURE*

Course	Class Hours	Lab Hours	Total Hours
Quarter I			
GENERAL CURRICULUM:			
Mathematics	13	7	20
Aircraft Drawings	17	21	38
Basic Physics	6	2	8
Basic Electricity	45	38	83
Fluid Lines and Fittings	8.5	16.5	25
Materials and Processes	40	40.5	80.5
Cleaning and Corrosion Control	12	26	38
Ground Operation and Servicing	10.5	19.5	30
	152	170.5	322.5
Quarter II			
GENERAL CURRICULUM:			
Maintenance Publications	9.5	9.5	19
Mechanic Privileges and Limitations	2	3	5
Maintenance Forms and Records	8.5	5	13.5
Aircraft Weight and Balance	16.5	23.5	40
AIRFRAME CURRICULUM:			
Wood Structures	10	2.5	12.5
Fabric Covering	7.5	14	21.5
Aircraft Finishes	9	21	30
Sheet Metal Structures	42	104	146
Welding	7	25.5	32.5
	112	208	320
Quarter III			
AIRFRAME CURRICULUM:			
Welding	9.5	8	17.5
Assembly and Rigging	20	41	61
Airframe Inspections	2	18	20
Aircraft Electrical Systems	51	54	105
Hydraulic and Pneumatic Power Systems	33	39	72
Aircraft Landing Gear Systems	16	25	41
	131.5	185	316.5
Quarter IV			
AIRFRAME CURRICULUM:			
Aircraft Landing Gear Systems	16	25	41
Position and Warning Systems	8.5	11.5	20
Aircraft Instrument Systems	9	11	20
Aircraft Fuel Systems	20	16	36
Communications and Navigation Systems	15	5	20

Cabin Atmosphere Control Systems	26	4	30
Ice and Rain Control	4	8	12
Fire Protection Systems	5	7	12
POWERPLANT CURRICULUM:			
Lubrication Systems	38	31	69
Engine Fuel Systems	5.5	8	13.5
Fuel Metering Systems	13	17	30
	160	143.5	303.5

Quarter V

POWERPLANT CURRICULUM:			
Fuel Metering Systems	17	11	28
Induction Systems	8.5	10	18.5
Engine Cooling Systems	3.5	6.5	10
Engine Exhaust Systems	8	9	17
Ignition Systems	41	49	90
Engine Electrical Systems	29.5	28	57.5
Engine Instrument Systems	13	7.5	20.5
Engine Fire Protection Systems	2.5	2.5	5
Propellers	30.5	38	68.5
	153.5	161.5	315

Quarter VI

POWERPLANT CURRICULUM:			
Propellers	5.5	9	14.5
Reciprocating Engines	75.5	163	238.5
Turbine Engines	34	25.5	59.5
Engine Inspection	3	7	10
	118	204.5	322.5
Total Program Hours	827	1073	1900

*This curriculum structure is designed to be used for group instruction.

AVIATION MECHANICS SUGGESTED CURRICULUM STRUCTURE*

ORIENTATION:
- School Policies and Procedures
- Program Orientation and Safety
- Operation of Audiovisual Equipment
- Using the Learning Resource Center

GENERAL CURRICULUM:
- Mathematics
- Aircraft Drawings
- Basic Electricity
- Fluid Lines and Fittings
- Materials and Processes
- Cleaning and Corrosion Control
- Ground Operation and Servicing
- Maintenance Publications
- Mechanic Privileges and Limitations
- Maintenance Forms and Records
- Aircraft Weight and Balance

AIRFRAME CURRICULUM:
- Wood Structures
- Fabric Covering
- Aircraft Finishes
- Sheet Metal Structures
- Welding
- Assembly and Rigging
- Airframe Inspections
- Aircraft Electrical Systems
- Hydraulic and Pneumatic Power Systems
- Aircraft Landing Gear Systems
- Position and Warning Systems
- Aircraft Instrument Systems
- Aircraft Fuel Systems
- Communications and Navigation Systems
- Ice and Rain Control
- Fire Protection Systems

POWERPLANT CURRICULUM:
- Lubrication Systems
- Engine Fuel Systems
- Fuel Metering Systems
- Induction Systems
- Engine Cooling Systems
- Engine Exhaust Systems
- Ignition Systems
- Engine Electrical Systems
- Engine Instrument Systems
- Engine Fire Protection Systems
- Propellers
- Reciprocating Engines
- Turbine Engines
- Engine Inspection

*This curriculum structure is designed to be used for individualized instruction.

INTRODUCTION TO AVIATION MECHANICS EXIT POINTS

The following diagrams illustrate points in the Aviation Mechanics program where a student should have acquired competencies necessary for entry level employment.

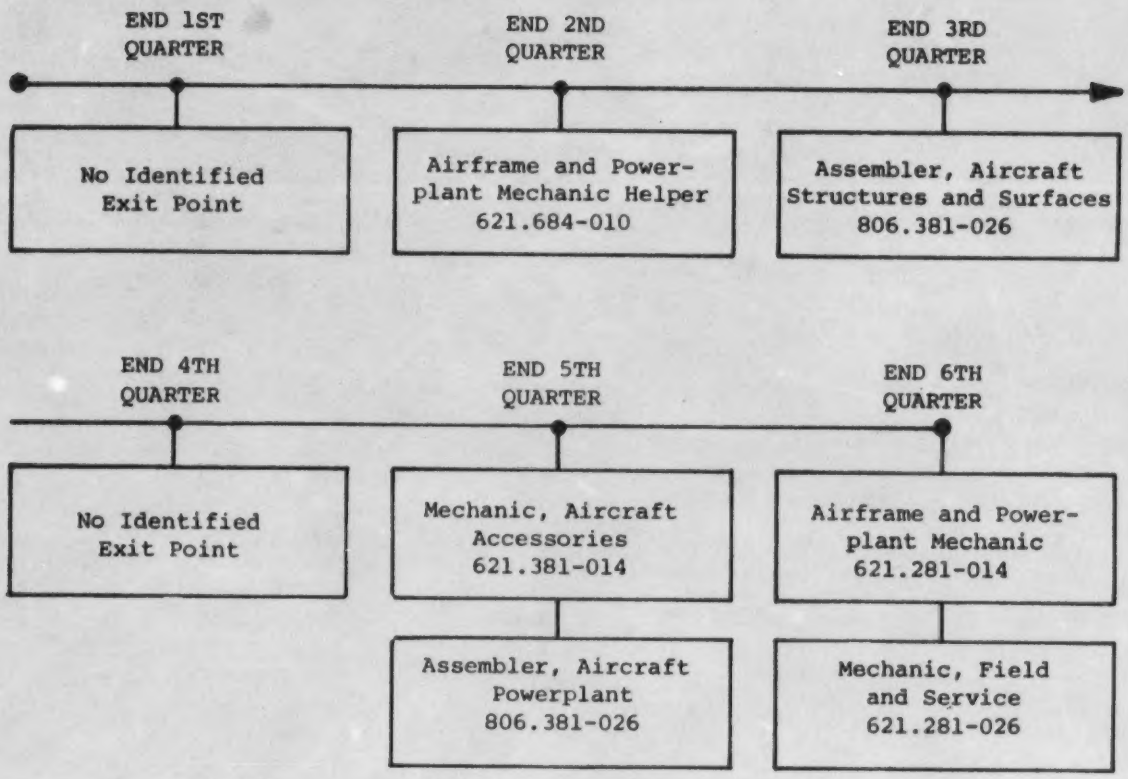
Both the group and individualized exit point diagrams sequence the Aviation Mechanics job classifications from least to most difficult. The group exit point diagram illustrates a lock-step process in which students proceed through an entire program at the same pace and exit at approximately the same point in time.

The individualized exit point diagram illustrates a self-paced progression through the Aviation Mechanics program. This approach permits a student to complete any <u>one</u> or <u>all</u> tasks necessary for entry level employment.

The major difference between the group and individualized approach is the number of tasks a student must master. For example, in the individualized approach, a student desiring employment in an aircraft assembly plant needs to complete only those tasks identified for that job. However, in the group approach, a student must master the tasks in the previous DOT classifications leading to that particular job title.

Both diagrams are based on the preceeding suggested curriculum structures.

AVIATION MECHANICS
(GROUP INSTRUCTION)



AVIATION MECHANICS
(INDIVIDUALIZED INSTRUCTION)

Airframe and Power-
plant Mechanic Helper
621.684-010

Assembler, Aircraft
Structures and Surfaces
806.381-026

Assembler, Aircraft
Powerplant
806.381-026

Mechanic, Aircraft
Acessories
621.381-014

Mechanic, Field
and Service
621.281-026

Airframe and Power-
plant Mechanic
621.281-014

INTRODUCTION TO THE COURSE OUTLINE

A course outline suggests a method of sequencing tasks for instruction. In the following outline, tasks are ordered according to duty areas and major blocks. Tasks are then arranged from general to specific knowledge and applications.

Class and lab hours for each task are assigned according to David Allen's, National Studies recommendations. The time allotments for the airframe and powerplant curriculum major blocks total 1500 hours, 750 hours for each, and the general curriculum block totals 400 hours. The 1900 total hours meet the requirements set by FAR 147. The student spends approximately 55% (1073) of total program time in the lab.

The following course outline is designed for group instruction, however, it may be adapted for individualized instruction by eliminating the time sequencing for tasks.

AVIATION MECHANICS SUGGESTED COURSE OUTLINE

Quarter I

Task	Title	Class Hours	Lab Hours
	MAJOR BLOCK: GENERAL CURRICULUM		
	DUTY I: MATHEMATICS		
GA-01	Extracting roots and raising numbers to a given power	3	0
GA-02	Determining areas and volumes of various geometrical shapes	4	2
GA-03	Solving ratio, proportion and percentage problems	3	2
GA-04	Performing algebraic operations involving addition, subtraction, multiplication and division of positive and negative numbers	3	3
		13	7
	DUTY II: AIRCRAFT DRAWINGS		
GA-05	Using drawings, symbols and schematic diagrams	7	7
GA-06	Drawing sketches of repairs and alterations	4	6
GA-07	Using blueprint information	5	6
GA-08	Using graphs and charts	1	2
		17	21
	DUTY III: BASIC PHYSICS		
GA-09	Using the principles of simple machines: sound, fluid and heat dynamics	6	2
		6	2
	DUTY IV: BASIC ELECTRICITY		
GA-10	Determining the relationship of voltage, current and resistance in electrical circuits	14	12.5
GA-11	Measuring voltage, current, resistance, continuity and leakage	4	3
GA-12	Measuring capacitance and inductance	4	2
GA-13	Calculating and measuring electrical power	2	2.5
GA-14	Reading and interpreting electrical circuit diagrams	3	3
GA-15	Inspecting and servicing batteries	5.5	4.5
GA-16	Overhauling aircraft electrical components	12.5	10.5
		45	38

Unit	Title	Class Hours	Lab Hours
	DUTY V: FLUID LINES AND FITTINGS		
GA-17	Fabricating and installing rigid flexible fluid lines and fittings	8.5	16.5
		8.5	16.5
	DUTY VI: MATERIALS AND PROCESSES		
GA-18	Performing precision measurements	2	10
GA-19	Identifying and selecting aircraft hardware and materials	21	17
GA-20	Performing basic heat-treating processes	5	1
GA-21	Performing penetrant, chemical etching and magnetic particle inspections	4	8.5
GA-22	Inspecting and checking welds	1	4
GA-23	Identifying and selecting appropriate nondestructive testing methods	7	0
		40	40.5
	DUTY VII: CLEANING AND CORROSION CONTROL		
GA-24	Identifying and selecting cleaning materials	4	8
GA-25	Performing aircraft cleaning and corrosion control	8	18
		12	26
	DUTY VIII: GROUND OPERATION AND SERVICING		
GA-26	Identifying and selecting fuels	2.5	1.5
GA-27	Starting, ground operating, moving, servicing and securing aircraft	8	18
		10.5	19.5
	Total Quarter I Class and Lab Hours	152	170.5
	Total Quarter I Instructional Time	322.5	

Quarter II

Task	Title	Class Hours	Lab Hours
	MAJOR BLOCK: GENERAL CURRICULUM (Con't)		
	DUTY IX: MAINTENANCE PUBLICATIONS		
GA-28	Selecting and using FAA and manufacturer's aircraft maintenance specifications, data sheets, manuals, publications and related Federal Aviation Regulations	6.5	6.5
GA-29	Reading technical data	3	3
		9.5	9.5
	DUTY X: MECHANIC PRIVILEGES AND LIMITATIONS		
GA-30	Exercising mechanic privileges within the limitations prescribed by FAR 65	2	3
		2	3
	DUTY XI: MAINTENANCE FORMS AND RECORDS		
GA-31	Writing description of aircraft condition and work performed	2	3
GA-32	Completing required maintenance forms, records and inspection reports	6.5	2
		8.5	5
	DUTY XII: AIRCRAFT WEIGHT AND BALANCE		
GA-33	Weighing aircraft	4.5	8.5
GA-34	Performing complete weight and balance check and recording data	12	15
		16.5	23.5
	MAJOR BLOCK: AIRFRAME CURRICULUM		
	DUTY I: WOOD STRUCTURES		
AF-01	Identifying wood defects	1	1
AF-02	Inspecting wood structures	1.5	1.5
AF-03	Servicing and repairing wood structures	7.5	0
		10	2.5

Task	Title	Class Hours	Lab Hours
	DUTY II: FABRIC COVERING		
AF-04	Selecting and applying fabric and fiberglass	3.5	5
AF-05	Inspecting, testing and repairing fabric and fiberglass	4	9
		7.5	14
	DUTY III: AIRCRAFT FINISHES		
AF-06	Applying trim, letters and touch-up paint	2	0
AF-07	Identifying and selecting aircraft finishing materials	2	1
AF-08	Applying paint and dope	4	18
AF-09	Inspecting finishes and identifying defects	1	2
		9	21
	DUTY IV: SHEET METAL STRUCTURES		
AF-10	Installing conventional rivets	5	16
AF-11	Installing special rivets and fasteners	5	10
AF-12	Hand forming, laying out and bending sheet metal	7	27
AF-13	Inspecting and repairing sheet metal structures	15	29
AF-14	Inspecting bonded structures	4	5
AF-15	Inspecting and repairing plastics, honeycomb and laminated structures	3	8
AF-16	Inspecting, checking, servicing and repairing windows, doors and interior furnishings	3	9
		42	104
	DUTY V: WELDING		
AF-17	Soldering, brazing and arc welding steel	7	25.5
		7	25.5
	Total Quarter II Class and Lab Hours	112	208
	Total Quarter II Instructional Time	320	

Quarter III

Task	Title		
	MAJOR BLOCK: AIRFRAME CURRICULUM		
	DUTY V: WELDING (Con't)		
AF-18	Fabricating tubular structures	6	5
AF-19	Soldering stainless steel	1	0
AF-20	Welding stainless steel and aluminum	0.5	3
AF-21	Welding magnesium and titanium	2	0
		9.5	8
	DUTY VI: ASSEMBLY AND RIGGING		
AF-22	Rigging fixed wing aircraft	4	5
AF-23	Rigging rotary wing aircraft	8	0
AF-24	Checking alignment of structures	2	8
AF-25	Assembling aircraft	1	6
AF-26	Balancing and rigging movable surfaces	4	20
AF-27	Jacking aircraft	1	2
		20	41
	DUTY VII: AIRFRAME INSPECTIONS		
AF-28	Performing 100-hour or annual inspection	2	18
		2	18
	DUTY VIII: AIRCRAFT ELECTRICAL SYSTEMS		
AF-29	Installing, checking and servicing airframe electrical wiring, controls, switches, indicators and protective devices	18.5	24
AF-30	Inspecting, checking, troubleshooting, servicing and repairing alternating current and direct current electrical systems	19.5	18.5
AF-31	Repairing aircraft electrical system components	13	11.5
		51	54
	DUTY IX: HYDRAULIC AND PNEUMATIC POWER SYSTEMS		
AF-32	Identifying and selecting hydraulic fluids	1	1
AF-33	Repairing hydraulic and pneumatic power system components	7	8
AF-34	Inspecting, checking, servicing, troubleshooting and repairing hydraulic and pneumatic power systems	25	30
		33	39

Task	Title	Class Hours	Lab Hours
	DUTY X: AIRCRAFT LANDING GEAR SYSTEMS		
AF-35	Inspecting, checking, servicing and repairing landing gear and systems	16	25
		16	25
	Total Quarter III Class and Lab Hours	131.5	185
	Total Quarter III Instructional Time	316.5	

Quarter IV

Task	Title	Class Hours	Lab Hours
	MAJOR BLOCK: AIRFRAME CURRICULUM (Con't)		
	DUTY X: AIRCRAFT LANDING GEAR SYSTEMS (Con't)		
AF-35	Inspecting, checking, servicing and repairing landing gear and systems (con't)	16	25
		16	25
	DUTY XI: POSITION AND WARNING SYSTEMS		
AF-36	Inspecting, checking and servicing speed and takeoff-warning systems and anti-skid electrical brake controls	5.5	5.5
AF-37	Inspecting, checking, troubleshooting, servicing and repairing landing gear position indicating and warning system	3	6
		8.5	11.5
	DUTY XII: AIRCRAFT INSTRUMENT SYSTEMS		
AF-38	Installing instruments	5	6
AF-39	Inspecting, checking, servicing, troubleshooting and repairing heading, speed, altitude, time, attitude, temperature, pressure and position indicating systems	4	5
		9	11
	DUTY XIII: AIRCRAFT FUEL SYSTEMS		
AF-40	Inspecting, checking, servicing, troubleshooting and repairing aircraft fuel systems	6	7
AF-41	Repairing aircraft fuel system components	5	5
AF-42	Inspecting and repairing fuel quantity indicating systems	3	3
AF-43	Inspecting, checking and repairing pressure fueling systems	2	0
AF-44	Checking and servicing fuel dump systems	1	0
AF-45	Performing fuel management transfer and defueling	2	0
AF-46	Troubleshooting, servicing and repairing fluid pressure and temperature warning systems	1	1
		20	16

	DUTY XIV: COMMUNICATIONS AND NAVIGATION SYSTEMS		
AF-47	Inspecting, checking and servicing auto-pilot and approach control systems	5	0
AF-48	Inspecting, checking and servicing aircraft electronic communication and navigation systems	5	0
AF-49	Inspecting and repairing antenna and electronic equipment installations	5	5
		15	5
	DUTY XV: CABIN ATMOSPHERE CONTROL SYSTEMS		
AF-50	Inspecting, checking, trouble-shooting, servicing and repairing heating, cooling, air conditioning and pressurization systems	14	0
AF-51	Inspecting, checking, trouble-shooting, servicing and repairing oxygen systems	3	4
AF-52	Repairing heating, cooling, air conditioning, pressurization and oxygen system components	9	0
		26	4
	DUTY XVI: ICE AND RAIN CONTROL		
AF-53	Inspecting, checking, trouble-shooting, servicing and repairing airframe ice and rain control systems	4	8
		4	8
	DUTY XVII: FIRE PROTECTION SYSTEMS		
AF-54	Inspecting, checking and servicing smoke and carbon monoxide detection systems	1	0
AF-55	Inspecting, checking, servicing, troubleshooting and repairing air-craft fire detection and extinguish-ing systems	4	7
		5	7
	MAJOR BLOCK: POWER PLANT CURRICULUM		
	DUTY I: LUBRICATION SYSTEMS		
PP-01	Identifying and selecting lubricants	5	5.5
PP-02	Inspecting, checking, servicing, troubleshooting and repairing engine lubrication systems	22	18.5

Task	Title	Class Hours	Lab Hours
PP-03	Repairing engine lubrication system components	11	7
		38	31
	DUTY II: ENGINE FUEL SYSTEMS		
PP-04	Inspecting, checking, servicing, troubleshooting and repairing engine fuel systems	2	3
PP-05	Repairing engine fuel system components	3.5	5
		5.5	8
	DUTY III: FUEL METERING SYSTEMS		
PP-06	Inspecting, checking, servicing, troubleshooting and repairing reciprocating and turbine engine fuel metering systems	13	17
		13	17
	Total Quarter IV Class and Lab Hours	160	143.5
	Total Quarter IV Instructional Time	303.5	

Quarter V

Task	Title	Class Hours	Lab Hours
	MAJOR BLOCK POWER PLANT CURRICULUM (Con't)		
	DUTY III: FUEL METERING SYSTEMS (Con't)		
PP-07	Overhauling carburetors	12	8
PP-08	Repairing engine fuel metering system components	3	3
PP-09	Inspecting, checking and servicing water injection systems	2	0
		17	11
	DUTY IV: INDUCTION SYSTEMS		
PP-10	Inspecting, checking, troubleshooting, servicing and repairing engine ice and rain control systems	2	2.5
PP-11	Inspecting, checking, servicing and repairing heat exchangers and superchargers	4	3.5
PP-12	Inspecting, checking, servicing and repairing carburetor air intake and induction manifolds	2.5	4
		8.5	10
	DUTY V: ENGINE COOLING SYSTEMS		
PP-13	Inspecting, checking, troubleshooting, servicing and repairing engine cooling systems	3	4
PP-14	Repairing engine cooling system components	.5	2.5
		3.5	6.5
	DUTY VI: ENGINE EXHAUST SYSTEMS		
PP-15	Inspecting, checking, troubleshooting, servicing and repairing engine exhaust systems	6	7
PP-16	Repairing engine exhaust system components	2	2
		8	9
	DUTY VII: IGNITION SYSTEMS		
PP-17	Overhauling magneto and ignition harness	15	15

Task	Title	Class Hours	Lab Hours
PP-18	Inspecting, checking, servicing, troubleshooting and repairing reciprocating and turbine engine ignition systems	12	20
PP-19	Repairing engine ignition system components	14	14
		41	49
	DUTY VIII: ENGINE ELECTRICAL SYSTEMS		
PP-20	Installing, checking and servicing engine electrical wiring, controls, switches, indicators and protective devices	18.5	19.5
PP-21	Repairing engine electrical system components	11	8.5
		29.5	28
	DUTY IX: ENGINE INSTRUMENT SYSTEMS		
PP-22	Inspecting, checking, servicing, troubleshooting and repairing engine temperature, pressure and RPM indicating systems	11	7
PP-23	Troubleshooting, servicing and repairing fluid rate of flow indicating systems	2	0.5
		13	7.5
	DUTY X: ENGINE FIRE PROTECTION SYSTEMS		
PP-24	Inspecting, checking, servicing, troubleshooting and repairing engine fire detection and extinguishing systems	2.5	2.5
		2.5	2.5
	DUTY XI: PROPELLERS		
PP-25	Inspecting, checking, servicing and repairing fixed-pitch, constant-speed, feather propeller and propeller governing systems	14	19
PP-26	Installing, troubleshooting and removing propellers	7.5	13
PP-27	Inspecting, checking, servicing and repairing propeller synchronizing and ice control systems	8	5
PP-28	Identifying and selecting propeller lubricants	1	1
		30.5	38

Total Quarter V Class and Lab Hours	153.5	161.5
Total Quarter V Instructional Time	315	

Quarter VI

Task	Title	Class Hours	Lab Hours
	MAJOR BLOCK: POWER PLANT CURRICULUM (Con't)		
	DUTY XI: PROPELLERS (Con't)		
PP-29	Balancing propellers	2.5	4
PP-30	Repairing propeller control system components	3	5
		5.5	9
	DUTY XII: RECIPROCATING ENGINES		
PP-31	Overhauling reciprocating engines	24	80
PP-32	Inspecting and repairing reciprocating engines	15.5	28
PP-33	Inspecting, checking, servicing and repairing opposed and radial engines and reciprocating engine installations	20.5	30.5
PP-34	Installing, troubleshooting and removing reciprocating engines	15.5	24.5
		75.5	163
	DUTY XIII: TURBINE ENGINES		
PP-35	Overhauling turbine engines	24	10
PP-36	Inspecting, checking, servicing and repairing turbine engine installations	5	5
PP-37	Installing, troubleshooting and removing turbine engines	5	10.5
		34	25.5
	DUTY XIV: ENGINE INSPECTION		
PP-38	Performing powerplant conformity and airworthiness inspection	3	7
		3	7
	Total Quarter VI Class and Lab Hours	118	204.5
	Total Quarter VI Instructional Time	322.5	

SECTION V

RECORDS

SECTION V

Section V Content List

Individualized Competency Record
Group Progress Chart

Section V presents suggested ways of recording and documenting the progress of students through the curriculum. The recommended procedures include options for both individual and group records. The very important function of communicating the student's qualifications to potential employers is handled clearly and efficiently by the use of the Certificate of Competency, which is also described in this section.

RECORDS MANAGEMENT

This guide provides a series of easy to use documents that will aid the instructor in recordkeeping and that will be beneficial to the student in entering the work force.

In addition to providing the instructor with an "at a glance" assessment of individual and/or group progress, a Certificate of Competency, which can be used by students seeking employment, is included.

The group progress chart reflects individual task completion of all students. Due to confidentiality of records, grades must not be recorded on the chart. A notation indicating task completion (i.e., x or check) should be used.

INSTRUCTIONS

Instructions

Competency Checklist

1) Enter the student's name.
2) Enter the date and instructor's initials as each unit of instruction is completed.

The Competency Checklist automatically indicates when all the requirements for each DOT exit point or job title have been completed by the student. At each point on the certificate where an asterisk appears, the student is eligible to receive a Certificate of Competency.

Certificate of Competency

A Certificate of Competency is to be issued for each job title for which a student is qualified.

1) Enter the student's name.
2) Enter the school's name
3) Sign and date the form.

A Certificate of Competency may be issued at the time a student qualifies for it, or all certificates for which a student qualifies may be issued to the student when he/she completes or leaves the program.

Group Progress Chart

1) Enter all program tasks across top of matrix.
2) Enter the students' names down the left hand side of matrix.
3) As each student completes a task, a notation should be made in the square which corresponds with the task and the student's name.

COMPETENCY CHECKLIST

PROGRAM: AVIATION MECHANICS

STUDENT NAME: _____

EXIT POINTS

TASK NO.	UNIT COMPETENCIES	DATE	IN'T.	JOB TITLE / DOT NO.	Airframe and Powerplant Mechanic Helper 621.684-010	Mechanic, Aircraft Accessories 621.381-014	Mechanic, Field and Service 621.281-026	Airframe and Powerplant Mechanic 621.281-014	Assembler, Aircraft Powerplant 806.381-022	Assembler, Aircraft Structures and Surfaces 806.381-026
	General Curriculum									
GA-01	Extracting roots and raising numbers to a given power					X	X	X	X	X
GA-02	Determining areas and volumes of various geometrical shapes					X	X	X	X	X
GA-03	Solving ratio, proportion and percentage problems					X	X	X	X	X
GA-04	Performing algebraic operations involving addition, subtraction, multiplication and division of positive and negative numbers					X	X	X	X	X
GA-05	Using drawings, symbols and schematic diagrams				X	X	X	X	X	X
GA-06	Drawing sketches of repairs and alterations				X	X	X	X	X	X
GA-07	Using blueprint information				X	X	X	X	X	X
GA-08	Using graphs and charts				X	X	X	X	X	X
GA-09	Using the principles of simple machines: sound, fluid and heat dynamics					X	X	X		
GA-10	Determining the relationship of voltage, current and resistance in electrical circuits					X	X	X	X	X
GA-11	Measuring voltage, current, resistance, continuity and leakage					X	X	X	X	X
GA-12	Measuring capacitance and inductance					X	X	X	X	X
GA-13	Calculating and measuring electrical power					X	X	X	X	X
GA-14	Reading and interpreting electrical circuit diagrams				X	X	X	X	X	X
GA-15	Inspecting and servicing batteries				X	X	X	X	X	X
GA-16	Overhauling aircraft electrical components					X	X	X	X	X
GA-17	Fabricating and installing rigid flexible fluid lines and fittings				X	X	X	X	X	X
GA-18	Performing precision measurements					X	X	X	X	X
GA-19	Identifying and selecting aircraft hardware and materials				X	X	X	X	X	X
GA-20	Performing basic heat-treating processes					X	X	X	X	X
GA-21	Performing penetrant, chemical etching and magnetic particle inspections									
GA-22	Inspecting and checking welds				X	X	X	X	X	X
GA-23	Identifying and selecting appropriate nondestructive testing methods				X	X	X	X	X	X
GA-24	Identifying and selecting cleaning materials				X	X	X	X	X	X
GA-25	Performing aircraft cleaning and corrosion control				X	X	X	X	X	X
GA-26	Identifying and selecting fuels				X	X	X	X	X	X
GA-27	Starting, ground operating, moving, servicing and securing aircraft				X		X	X	X	X
GA-28	Selecting and using FAA and manufacturer's aircraft maintenance specifications, data sheets, manuals, publications and related Federal Aviation Regulations				X	X	X	X	X	X
GA-29	Reading technical data				X	X	X	X	X	X
GA-30	Exercising mechanic privileges within the limitations prescribed by FAR 65				X	X	X	X	X	X
GA-31	Writing description of aircraft condition and work performed				X	X	X	X	X	X
GA-32	Completing required maintenance forms, records and inspection reports				X	X	X	X	X	X
GA-33	Weighing aircraft				X		X	X	X	X
GA-34	Performing complete weight and balance check and recording data						X	X	X	X
	Airframe Curriculum									
AF-01	Identifying wood defects						X	X		X
AF-02	Inspecting wood structures						X	X		X
AF-03	Servicing and repairing wood structures						X	X		X
AF-04	Selecting and applying fabric and fiberglass						X	X		X

EXIT POINTS

TASK NO.	UNIT COMPETENCIES	DATE	IN'T.	Airframe and Powerplant Mechanic Helper (621.684-010)	Mechanic, Aircraft Accessories (621.381-014)	Mechanic, Field and Service (621.281-026)	Airframe and Powerplant Mechanic (621.281-014)	Assembler, Aircraft Powerplant (806.381-022)	Assembler, Aircraft Structures and Surfaces (806.381-026)
AF-05	Inspecting, testing and repairing fabric and fiberglass					X	X		X
AF-06	Applying trim, letters and touch-up paint			X		X	X		
AF-07	Identifying and selecting aircraft finishing materials			X		X	X		
AF-08	Applying paint and dope			X		X	X		
AF-09	Inspecting finishes and identifying defects					X	X		
AF-10	Installing conventional rivets			X		X	X		X
AF-11	Installing special rivets and fasteners			X		X	X		X
AF-12	Handforming, laying out and bending sheet metal					X	X		X
AF-13	Inspecting and repairing sheet metal structures					X	X		X
AF-14	Inspecting bonded structures					X	X		X
AF-15	Inspecting and repairing plastics, honeycomb and laminated structures					X	X		X
AF-16	Inspecting, checking, servicing and repairing windows, doors and interior furnishings					X	X		X
AF-17	Soldering, brazing and arc welding steel						X		X
AF-18	Fabricating tubular structures						X		X
AF-19	Soldering stainless steel						X		
AF-20	Welding stainless steel and aluminum						X		
AF-21	Welding magnesium and titanium						X		
AF-22	Rigging fixed wing aircraft					X	X		X
AF-23	Rigging rotary wing aircraft					X	X		X
AF-24	Checking alignment of structures					X	X		X
AF-25	Assembling aircraft					X	X		X
AF-26	Balancing and rigging movable surfaces					X	X		X
AF-27	Jacking aircraft			X		X	X		X
AF-28	Performing 100-hour or annual inspection					X	X		
AF-29	Installing, checking and servicing airframe electrical wiring, controls, switches, indicators and protective devices			X		X	X		
AF-30	Inspecting, checking, troubleshooting, servicing and repairing alternating current and direct current electrical systems					X	X		
AF-31	Repairing aircraft electrical system components					X	X		
AF-32	Identifying and selecting hydraulic fluids			X		X	X		
AF-33	Repairing hydraulic and pneumatic power system components				X		X		
AF-34	Inspecting, checking, servicing, troubleshooting and repairing hydraulic and pneumatic power systems					X	X		
AF-35	Inspecting, checking, servicing and repairing landing gear, retraction systems, shock struts, brakes, wheels, tires and steering systems					X	X		
AF-36	Inspecting, checking and servicing speed and takeoff-warning systems and anti-skid electrical brake controls					X	X		
AF-37	Inspecting, checking, troubleshooting, servicing and repairing landing gear position indicating and warning system					X	X		
AF-38	Installing instruments					X	X		
AF-39	Inspecting, checking, servicing, troubleshooting and repairing heading, speed, altitude, time, attitude, temperature, pressure and position indicating systems					X	X		
AF-40	Inspecting, checking, servicing, troubleshooting and repairing aircraft fuel systems					X	X		
AF-41	Repairing aircraft fuel system components				X		X		

EXIT POINTS

TASK NO.	UNIT COMPETENCIES	DATE	IN'T.	JOB TITLE / DOT NO.	Airframe and Powerplant Mechanic Helper 621.684-010	Mechanic, Aircraft Accessories 621.381-014	Mechanic, Field and Service 621.281-026	Airframe and Powerplant Mechanic 621.281-014	Assembler, Aircraft Powerplant 806.381-022	Assembler, Aircraft Structures and Surfaces 806.381-026
AF-42	Inspecting and repairing fuel quantity indicating systems						X	X		
AF-43	Inspecting, checking and repairing pressure fueling systems						X	X		
AF-44	Checking and servicing fuel dump systems						X	X		
AF-45	Performing fuel management transfer and defueling				X		X	X		
AF-46	Troubleshooting, servicing and repairing fluid pressure and temperature warning systems							X		
AF-47	Inspecting, checking and servicing auto-pilot and approach control systems							X		
AF-48	Inspecting, checking and servicing aircraft electronic communication and navigation systems						X	X		
AF-49	Inspecting and repairing antenna and electronic equipment installations						X	X		
AF-50	Inspecting, checking, troubleshooting, servicing and repairing heating, cooling, air conditioning and pressurization systems						X	X		
AF-51	Inspecting, checking, troubleshooting, servicing and repairing oxygen systems						X	X		
AF-52	Repairing heating, cooling, air conditioning, pressurization and oxygen system components					X		X		
AF-53	Inspecting, checking, troubleshooting, servicing and repairing airframe ice and rain control systems						X	X		
AF-54	Inspecting, checking and servicing smoke and carbon monoxide detection systems						X	X		
AF-55	Inspecting, checking, servicing, troubleshooting and repairing aircraft fire detection and extinguishing systems						X	X		
	<u>Powerplant Curriculum</u>									
PP-01	Identifying and selecting lubricants				X	X	X	X	X	
PP-02	Inspecting, checking, servicing, troubleshooting and repairing engine lubrication systems						X	X		
PP-03	Repairing engine lubrication system components							X		
PP-04	Inspecting, checking, servicing, troubleshooting and repairing engine fuel systems						X	X		
PP-05	Repairing engine fuel system components					X		X		
PP-06	Inspecting, checking, servicing, troubleshooting and repairing reciprocating and turbine engine fuel metering systems						X	X		
PP-07	Overhauling carburetors					X		X		
PP-08	Repairing engine fuel metering system components					X		X		
PP-09	Inspecting, checking and servicing water injection systems						X	X		
PP-10	Inspecting, checking, troubleshooting, servicing and repairing engine ice and rain control systems						X	X		
PP-11	Inspecting, checking, servicing and repairing heat exchangers and superchargers						X	X		
PP-12	Inspecting, checking, servicing and repairing carburetor air intake and induction manifolds						X	X		
PP-13	Inspecting, checking, troubleshooting, servicing and repairing engine cooling systems						X	X		
PP-14	Repairing engine cooling system components					X		X		
PP-15	Inspecting, checking, troubleshooting, servicing and repairing engine exhaust systems						X	X		
PP-16	Repairing engine exhaust system components					X		X		

EXIT POINTS

TASK NO.	UNIT COMPETENCIES	DATE	IN'T.	JOB TITLE / DOT NO.	Airframe and Powerplant Mechanic Helper 621.684-010	Mechanic, Aircraft Accessories 621.381-014	Mechanic, Field and Service 621.281-026	Airframe and Powerplant Mechanic 621.281-014	Assembler, Aircraft Powerplant 806.381-022	Assembler, Aircraft Structures and Surfaces 806.381-026
PP-17	Overhauling magneto and ignition harness					X		X		
PP-18	Inspecting, checking, servicing, troubleshooting and repairing reciprocating and turbine engine ignition systems						X	X		
PP-19	Repairing engine ignition system components					X		X		
PP-20	Installing, checking and servicing engine electrical wiring, controls, switches, indicators and protective devices						X	X		
PP-21	Repairing engine electrical system components						X	X		
PP-22	Inspecting, checking, servicing, troubleshooting and repairing engine temperature, pressure and RPM indicating systems						X	X		
PP-23	Troubleshooting, servicing and repairing fluid rate of flow indicating systems									
PP-24	Inspecting, checking, servicing, troubleshooting and repairing engine fire detection and extinguishing systems						X	X		
PP-25	Inspecting, checking, servicing and repairing fixed-pitch, constant-speed, feather propeller and propeller governing systems						X	X		
PP-26	Installing, troubleshooting and removing propellers							X	X	
PP-27	Inspecting, checking, servicing and repairing propeller synchronizing and ice control systems						X	X		
PP-28	Identifying and selecting propeller lubricants				*X	*X	X	X	X	
PP-29	Balancing propellers							X		
PP-30	Repairing propeller control system components						X	X		
PP-31	Overhauling reciprocating engines							X		
PP-32	Inspecting and repairing reciprocating engines						X	X		
PP-33	Inspecting, checking, servicing and repairing opposed and radial engines and reciprocating engine installations						X	X		
PP-34	Installing, troubleshooting and removing reciprocating engines							X	X	
PP-35	Overhauling turbine engines							X		
PP-36	Inspecting, checking, servicing and repairing turbine engine installations						X	X		
PP-37	Installing, troubleshooting and removing turbine engines							X	X	
PP-38	Performing powerplant conformity and airworthiness inspection							*X	*X	*X

*Certificate of Competency can be issued

CERTIFICATE OF COMPETENCY

This is to Certify that

J. J. Jamerson

SAMPLE

South Georgia Tech

has successfully mastered the competencies required to perform the job of

MECHANIC, AIRCRAFT ACCESSORIES

Jack E. Smith

Oct. 15, 1981

V-11

The student named on this certificate has demonstrated mastery of the following unit level competencies required to perform the job of Mechanic, Aircraft Accessories.

MECHANIC, AIRCRAFT ACCESSORIES
(D.O.T. 621.381-014)

Mathematics
Extracting roots and raising numbers to a given power
Determining areas and volumes of various geometrical shapes
Solving ratio, proportion and percentage problems
Performing algebraic operations involving addition, subtraction, multiplication and division of positive and negative numbers

Aircraft Drawings
Using drawings, symbols and schematic diagrams
Drawing sketches of repairs and alterations
Using blueprint information
Using graphs and charts

Basic Physics
Using the principles of simple machines: sound, fluid and heat dynamics

Basic Electricity
Determining the relationship of voltage, current and resistance in electrical circuits
Measuring voltage, current, resistance, continuity and leakage
Measuring capacitance and inductance
Calculating and measuring electrical power
Reading and interpreting electrical circuit diagrams
Inspecting and servicing batteries
Overhauling aircraft electrical components

Fluid Lines and Fittings
Fabricating and installing rigid flexible fluid lines and fittings

Materials and Processes
Performing precision measurements
Identifying and selecting aircraft hardware and materials
Performing basic heat-treating processes
Performing penetrant, chemical etching and magnetic particle inspections
Inspecting and checking welds
Identifying and selecting appropriate non-destructive testing methods

Cleaning and Corrosion Control
Identifying and selecting cleaning materials
Performing aircraft cleaning and corrosion control

Ground Operation and Servicing
Identifying and selecting fuels
Starting, ground operating, moving, servicing and securing aircraft

Maintenance Publications
Selecting and using FAA and manufacturer's aircraft maintenance specifications, data sheets, manuals, publications and related Federal Aviation Regulations
Reading technical data

Mechanic Privileges and Limitations
Exercising mechanic privileges within the limitations prescribed by FAR 65

Maintenance Forms and Records
Writing description of aircraft condition and work performed
Completing required maintenance forms records and inspection reports

Hydraulic and Pneumatic Power Systems
Repairing hydraulic and pneumatic power system components

Aircraft Fuel Systems
Repairing aircraft fuel system components

Cabin Atmosphere Control Systems
Repairing heating, cooling, air conditioning, pressurization and oxygen system components

Lubrication Systems
Identifying and selecting lubricants

Engine Fuel Systems
Repairing engine fuel system components

Fuel Metering Systems
Overhauling carburetors
Repairing engine fuel metering system components

Engine Cooling Systems
Repairing engine cooling system components

Engine Exhaust Systems
Repairing engine exhaust system components

Ignition Systems
Overhauling magneto and ignition harness
Repairing engine ignition system components

Propellers
Identifying and selecting propeller lubricants

CERTIFICATE OF COMPETENCY

This is to Certify that

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of

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has successfully mastered the competencies required to perform the job of

AIRFRAME AND POWERPLANT MECHANIC HELPER

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V-13

The student named on this certificate has demonstrated mastery of the following unit level competencies required to perform the job of Airframe and Powerplant Mechanic Helper.

AIRFRAME AND POWERPLANT MECHANIC HELPER
(D.O.T. 621.381-014)

Aircraft Drawings
Using drawings, symbols and schematic diagrams
Drawing sketches of repairs and alterations
Using blueprint information
Using graphs and charts

Basic Electricity
Reading and interpreting electrical circuit diagrams
Inspecting and servicing batteries

Fluid Lines and Fittings
Fabricating and installing rigid flexible fluid lines and fittings

Materials and Processes
Identifying and selecting aircraft hardware and materials
Performing penetrant, chemical etching and magnetic particle inspections
Inspecting and checking welds
Identifying and selecting appropriate non-destructive testing methods

Cleaning and Corrosion Control
Identifying and selecting cleaning materials
Performing aircraft cleaning and corrosion control

Ground Operation and Servicing
Identifying and selecting fuels
Starting, ground operating, moving, servicing and securing aircraft

Maintenance Publications
Selecting and using FAA and manufacturer's aircraft maintenance specifications, data sheets, manuals, publications and related Federal Aviation Regulations
Reading technical data

Mechanic Privileges and Limitations
Exercising mechanic privileges within the limitations prescribed by FAR 65

Maintenance Forms and Records
Writing description of aircraft condition and work performed
Completing required maintenance forms, records and inspection reports

Aircraft Weight and Balance
Weighing aircraft

Aircraft Finishes
Applying trim, letters and touch-up paint
Identifying and selecting aircraft finishing materials
Applying paint and dope

Sheet Metal Structures
Installing conventional rivets
Installing special rivets and fasteners

Assembly and Rigging
Jacking aircraft

Aircraft Electrical Systems
Installing, checking and servicing airframe electrical wiring, controls, switches, indicators and protective devices

Hydraulic and Pneumatic Power Systems
Identifying and selecting hydraulic fluids

Aircraft Fuel Systems
Performing fuel management transfer and defueling

Lubrication Systems
Identifying and selecting lubricants

Propellers
Identifying and selecting propeller lubricants

V-14

CERTIFICATE OF COMPETENCY

This is to Certify that

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of

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has successfully mastered the competencies required to perform the job of

MECHANIC, AIRCRAFT ACCESSORIES

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V-15

The student named on this certificate has demonstrated mastery of the following unit level competencies required to perform the job of Mechanic, Aircraft Accessories.

MECHANIC, AIRCRAFT ACCESSORIES
(D.O.T. 621.381-014)

Mathematics
Extracting roots and raising numbers to a given power
Determining areas and volumes of various geometrical shapes
Solving ratio, proportion and percentage problems
Performing algebraic operations involving addition, subtraction, multiplication and division of positive and negative numbers

Aircraft Drawings
Using drawings, symbols and schematic diagrams
Drawing sketches of repairs and alterations
Using blueprint information
Using graphs and charts

Basic Physics
Using the principles of simple machines: sound, fluid and heat dynamics

Basic Electricity
Determining the relationship of voltage, current and resistance in electrical circuits
Measuring voltage, current, resistance, continuity and leakage
Measuring capacitance and inductance
Calculating and measuring electrical power
Reading and interpreting electrical circuit diagrams
Inspecting and servicing batteries
Overhauling aircraft electrical components

Fluid Lines and Fittings
Fabricating and installing rigid flexible fluid lines and fittings

Materials and Processes
Performing precision measurements
Identifying and selecting aircraft hardware and materials
Performing basic heat-treating processes
Performing penetrant, chemical etching and magnetic particle inspections
Inspecting and checking welds
Identifying and selecting appropriate non-destructive testing methods

Cleaning and Corrosion Control
Identifying and selecting cleaning materials
Performing aircraft cleaning and corrosion control

Ground Operation and Servicing
Identifying and selecting fuels
Starting, ground operating, moving, servicing and securing aircraft

Maintenance Publications
Selecting and using FAA and manufacturer's aircraft maintenance specifications, data sheets, manuals, publications and related Federal Aviation Regulations
Reading technical data

Mechanic Privileges and Limitations
Exercising mechanic privileges within the limitations prescribed by FAR 65

Maintenance Forms and Records
Writing description of aircraft condition and work performed
Completing required maintenance forms records and inspection reports

Hydraulic and Pneumatic Power Systems
Repairing hydraulic and pneumatic power system components

Aircraft Fuel Systems
Repairing aircraft fuel system components

Cabin Atmosphere Control Systems
Repairing heating, cooling, air conditioning, pressurization and oxygen system components

Lubrication Systems
Identifying and selecting lubricants

Engine Fuel Systems
Repairing engine fuel system components

Fuel Metering Systems
Overhauling carburetors
Repairing engine fuel metering system components

Engine Cooling Systems
Repairing engine cooling system components

Engine Exhaust Systems
Repairing engine exhaust system components

Ignition Systems
Overhauling magneto and ignition harness
Repairing engine ignition system components

Propellers
Identifying and selecting propeller lubricants

V-16

CERTIFICATE OF COMPETENCY

This is to Certify that

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of

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has successfully mastered the competencies required to perform the job of

MECHANIC, FIELD AND SERVICE

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V-17

The student named on this certificate has demonstrated mastery of the following unit level competencies required to perform the job of Mechanic, Field and Service.

MECHANIC, FIELD AND SERVICE
(D.O.T. 621.281-026)

Mathematics
Extracting roots and raising numbers to a given power
Determining areas and volumes of various geometrical shapes
Solving ratio, proportion and percentage problems
Performing algebraic operations involving addition, subtraction, multiplication and division of positive and negative numbers

Aircraft Drawings
Using drawings, symbols and schematic diagrams
Drawing sketches of repairs and alterations
Using blueprint information
Using graphs and charts

Basic Physics
Using the principles of simple machines: sound, fluid and heat dynamics

Basic Electricity
Determining the relationship of voltage, current and resistance in electrical circuits
Measuring voltage, current, resistance, continuity and leakage
Measuring capacitance and inductance
Calculating and measuring electrical power
Reading and interpreting electrical circuit diagrams
Inspecting and servicing batteries
Overhauling aircraft electrical components

Fluid Lines and Fittings
Fabricating and installing rigid flexible fluid lines and fittings

Materials and Processes
Performing precision measurements
Identifying and selecting aircraft hardware and materials
Performing basic heat-treating processes

Aircraft Finishes
Applying trim, letters and touch-up paint
Identifying and selecting aircraft finishing materials
Applying paint and dope
Inspecting finishes and identifying defects

Sheet Metal Structures
Installing conventional rivets
Installing special rivets and fasteners
Handforming, laying out and bending sheet metal
Inspecting and repairing sheet metal structures
Inspecting bonded structures
Inspecting and repairing plastics, honeycomb and laminated structures
Inspecting, checking, servicing and repairing windows, doors and interior furnishings

Assembly and Rigging
Rigging fixed wing aircraft
Rigging rotary wing aircraft
Checking alignment of structures
Assembling aircraft
Balancing and rigging movable surfaces
Jacking aircraft

Airframe Inspection
Performing 100-hour or annual inspection

Aircraft Electrical Systems
Installing, checking and servicing airframe electrical wiring, controls, switches, indicators and protective devices
Inspecting, checking, troubleshooting, servicing and repairing alternating current and direct current electrical systems
Repairing aircraft electrical system components

Cabin Atmosphere Control Systems
Inspecting, checking, troubleshooting, servicing and repairing heating, cooling, air conditioning and pressurization systems
Inspecting, checking, troubleshooting, servicing and repairing oxygen systems

Ice and Rain Control
Inspecting, checking, troubleshooting, servicing and repairing airframe ice and rain control systems

Fire Protection Systems
Inspecting, checking and servicing smoke and carbon monoxide detection systems
Inspecting, checking, servicing, troubleshooting and repairing aircraft fire detection and extinguishing systems

Lubrication Systems
Identifying and selecting lubricants
Inspecting, checking, servicing, troubleshooting and repairing lubrication systems

Engine Fuel Systems
Inspecting, checking, servicing, troubleshooting and repairing engine fuel systems

Fuel Metering Systems
Inspecting, checking, servicing, troubleshooting and repairing reciprocating and turbine engine fuel metering systems
Inspecting, checking and servicing water injection systems

Induction Systems
Inspecting, checking troubleshooting, servicing and repairing engine ice and rain control systems
Inspecting, checking, servicing and repairing heat exchangers and superchargers
Inspecting, checking, servicing and repairing carburetor air intake and induction manifolds

Performing penetrant, chemical etching and magnetic particle inspections
Inspecting and checking welds
Identifying and selecting appropriate non-destructive testing methods

Cleaning and Corrosion Control
Identifying and selecting cleaning materials
Performing aircraft cleaning and corrosion control

Ground Operation and Servicing
Identifying and selecting fuels
starting, ground operating, moving, servicing and securing aircraft

Maintenance Publications
Selecting and using FAA and manufacturer's aircraft maintenance specifications, data sheets, manuals, publications and related Federal Aviation Regulations
Reading technical data

Mechanic Privileges and Limitations
Exercising mechanic privileges within the limitations prescribed by FAR 65

Maintenance Forms and Records
Writing description of aircraft condition and work performed
Completing required maintenance forms, records and inspection reports

Aircraft Weight and Balance
Weighing aircraft
Performing complete weight and balance check and recording data

Wood Structures
Identifying wood defects
Inspecting wood structures
Servicing and repairing wood structures

Fabric Covering
Selecting and applying fabric and fiberglass
Inspecting, testing and repairing fabric and fiberglass

Hydraulic and Pneumatic Power Systems
Identifying and selecting hydraulic fluids
Inspecting, checking, servicing, troubleshooting and repairing hydraulic and pneumatic power systems

Aircraft Landing Gear Systems
Inspecting, checking, servicing and repairing landing gear, retraction systems, shock struts, brakes, wheels, tires and steering systems

Position and Warning Systems
Inspecting, checking and servicing speed and takeoff-warning systems and anti-skid electrical brake controls
Inspecting, checking, troubleshooting, servicing and repairing landing gear position indicating and warning system

Aircraft Instrument Systems
Installing instruments
Inspecting, checking, servicing, troubleshooting and repairing heading, speed, altitude, time, attitude, temperature, pressure and position indicating systems

Aircraft Fuel Systems
Inspecting, checking, servicing, troubleshooting and repairing aircraft fuel systems
Inspecting and repairing fuel quantity indicating systems
Checking and servicing fuel pump systems
Performing fuel management transfer and defueling

Communications and Navigation Systems
Inspecting, checking and servicing aircraft electronic communication and navigation systems
Inspecting and repairing antenna and electronic equipment installations

Engine Cooling Systems
Inspecting, checking, troubleshooting, servicing and repairing engine cooling systems

Engine Exhaust Systems
Inspecting, checking, troubleshooting, servicing and repairing engine exhaust systems

Ignition Systems
Inspecting, checking, servicing, troubleshooting and repairing reciprocating and turbine engine ignition systems

Engine Electrical Systems
Installing, checking and servicing engine electrical wiring, controls, switches, indicators and protective devices
Repairing engine electrical system components

Engine Instrument Systems
Inspecting, checking, servicing, troubleshooting and repairing engine temperature, pressure and RPM indicating systems

Engine Fire Protection Systems
Inspecting, checking, servicing, troubleshooting and repairing engine fire detection and extinguishing systems

Propellers
Inspecting, checking, servicing and repairing fixed-pitch, constant-speed, feather propeller and propeller governing systems
Inspecting, checking, servicing and repairing propeller synchronizing and ice control systems
Identifying and selecting propeller lubricants
Repairing propeller control system components

Reciprocating Engines
Inspecting and repairing reciprocating engines
Inspecting, checking, servicing and repairing opposed and radial engines and reciprocating engine installations

Turbine Engines
Inspecting, checking, servicing and repairing turbine engine installations

CERTIFICATE OF COMPETENCY

This is to Certify that

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of

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has successfully mastered the competencies required to perform the job of

AIRFRAME AND POWERPLANT MECHANIC

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V-21

The student named on this certificate has demonstrated mastery of the following unit level competencies required to perform the job of Airframe and Powerplant Mechanic.

AIRFRAME AND POWERPLANT MECHANIC
(D.O.T. 621.281-014)

Mathematics
Extracting roots and raising numbers to a given power
Determining areas and volumes of various geometrical shapes
Solving ratio, proportion and percentage problems
Performing algebraic operations involving addition, subtraction, multiplication and division of positive and negative numbers

Aircraft Drawings
Using drawings, symbols and schematic diagrams
Drawing sketches of repairs and alterations
Using blueprint information
Using graphs and charts

Basic Physics
Using the principles of simple machines: sound, fluid and heat dynamics

Basic Electricity
Determining the relationship of voltage, current and resistance in electrical circuits
Measuring voltage, current, resistance, continuity and leakage
Measuring capacitance and inductance
Calculating and measuring electrical power
Reading and interpreting electrical circuit diagrams
Inspecting and servicing batteries
Overhauling aircraft electrical components

Fluid Lines and Fittings
Fabricating and installing rigid flexible fluid lines and fittings

Materials and Processes
Performing precision measurements
Identifying and selecting aircraft hardware and materials
Performing basic heat-treating processes
Performing penetrant, chemical etching and magnetic particle inspections
Inspecting and checking welds
Identifying and selecting appropriate non-destructive testing methods
Inspecting, checking, servicing and repairing windows, doors and interior furnishings

Welding
Soldering, brazing and arc welding steel
Fabricating tubular structures
Soldering stainless steel
Welding stainless steel and aluminum
Welding magnesium and titanium

Assembly and Rigging
Rigging fixed wing aircraft
Rigging rotary wing aircraft
Checking alignment of structures
Assembling aircraft
Balancing and rigging movable surfaces
Jacking aircraft

Airframe Inspection
Performing 100-hour or annual inspection

Aircraft Electrical Systems
Installing, checking and servicing airframe electrical wiring, controls, switches, indicators and protective devices
Inspecting, checking, troubleshooting, servicing and repairing alternating current and direct current electrical systems
Repairing aircraft electrical system components

Hydraulic and Pneumatic Power Systems
Identifying and selecting hydraulic fluids
Repairing hydraulic and pneumatic power system components
Inspecting, checking, servicing, troubleshooting and repairing hydraulic and pneumatic power systems

Aircraft Landing Gear Systems
Inspecting, checking, servicing and repairing landing gear, retraction systems, shock struts, brakes, wheels, tires and steering systems

Position and Warning Systems
Inspecting, checking and servicing speed and takeoff-warning systems and anti-skid electrical brake controls

Engine Fuel Systems
Inspecting, checking, servicing, troubleshooting and repairing engine fuel systems
Repairing engine fuel system components

Fuel Metering Systems
Inspecting, checking, servicing, troubleshooting and repairing reciprocating and turbine engine fuel metering systems
Overhauling carburetors
Repairing engine fuel metering system components
Inspecting, checking and servicing water injection systems

Induction Systems
Inspecting, checking, troubleshooting, servicing and repairing engine ice and rain control systems
Inspecting, checking, servicing and repairing heat exchangers and superchargers
Inspecting, checking, servicing and repairing carburetor air intake and induction manifolds

Engine Cooling Systems
Inspecting, checking, troubleshooting, servicing and repairing engine cooling systems
Repairing engine cooling system components

Engine Exhaust Systems
Inspecting, checking, troubleshooting, servicing and repairing engine exhaust systems
Repairing engine exhaust system components

Ignition Systems
Overhauling magneto and ignition harness
Inspecting, checking, servicing, troubleshooting and repairing reciprocating and turbine engine ignition systems
Repairing engine ignition system components

Engine Electrical Systems
Installing, checking and servicing engine electrical wiring, controls, switches, indicators and protective devices
Repairing engine electrical system components

Engine Instrument Systems
Inspecting, checking, servicing, troubleshooting and repairing engine temperature, pressure and RPM indicating systems

Cleaning and Corrosion Control
Identifying and selecting cleaning materials
Performing aircraft cleaning and corrosion control

Ground Operation and Servicing
Identifying and selecting fuels
Starting, ground operating, moving, servicing and securing aircraft

Maintenance Publications
Selecting and using FAA and manufacturer's aircraft maintenance specifications, data sheets, manuals, publications and related Federal Aviation Regulations
Reading technical data

Mechanic Privileges and Limitations
Exercising mechanic privileges within the limitations prescribed by FAR 65

Maintenance Forms and Records
Writing description of aircraft condition and work performed
Completing required maintenance forms, records and inspection reports

Aircraft Weight and Balance
Weighing aircraft
Performing complete weight and balance check and recording data

Wood Structures
Identifying wood defects
Inspecting wood structures
Servicing and repairing wood structures

Fabric Covering
Selecting and applying fabric and fiberglass
Inspecting, testing and repairing fabric and fiberglass

Aircraft Finishes
Applying trim, letters and touch-up paint
Identifying and selecting aircraft finishing materials
Applying paint and dope
Inspecting finishes and identifying defects

Sheet Metal Structures
Installing conventional rivets
Installing special rivets and fasteners
Handforming, laying out and bending sheet metal
Inspecting and repairing sheet metal structures
Inspecting bonded structures
Inspecting and repairing plastics, honeycomb and laminated structures

Inspecting, checking, troubleshooting, servicing and repairing landing gear position indicating and warning system

Aircraft Instrument Systems
Installing instruments
Inspecting, checking, servicing, troubleshooting and repairing heading, speed, altitude, time, attitude, temperature, pressure and position indicating systems

Aircraft Fuel Systems
Inspecting, checking, servicing, troubleshooting and repairing aircraft fuel systems
Repairing aircraft fuel system components
Inspecting and repairing fuel quantity indicating systems
Inspecting, checking and repairing pressure fueling systems
Checking and servicing fuel dump systems
Performing fuel management transfer and defueling
Troubleshooting, servicing and repairing fluid pressure and temperature warning systems

Communications and Navigation Systems
Inspecting, checking and servicing auto-pilot and approach control systems
Inspecting, checking and servicing aircraft electronic communication and navigation systems
Inspecting and repairing antenna and electronic equipment installations

Cabin Atmosphere Control Systems
Inspecting, checking, troubleshooting, servicing and repairing, heating, cooling, air conditioning and pressurization systems
Inspecting, checking, troubleshooting, servicing and repairing oxygen systems
Repairing, heating, cooling, air conditioning, pressurization and oxygen system components

Ice and Rain Control
Inspecting, checking, troubleshooting, servicing and repairing airframe ice and rain control systems

Fire Protection Systems
Inspecting, checking and servicing smoke and carbon monoxide detection systems
Inspecting, checking, servicing, troubleshooting and repairing aircraft fire detection and extinguishing systems

Lubrication Systems
Identifying and selecting lubricants
Inspecting, checking, servicing, troubleshooting and repairing engine lubrication systems
Repairing engine lubrication system components

Troubleshooting, servicing and repairing fluid rate of flow indicating systems

Engine Fire Protection Systems
Inspecting, checking, servicing, troubleshooting and repairing engine fire detection and extinguishing systems

Propellers
Inspecting, checking, servicing and repairing fixed-pitch, constant-speed, feather propeller and propeller governing systems
Installing, troubleshooting and removing propellers
Inspecting, checking, servicing and repairing propeller synchronizing and ice control systems
Identifying and selecting propeller lubricants
Balancing propellers
Repairing propeller control system components

Reciprocating Engines
Overhauling reciprocating engines
Inspecting and repairing reciprocating engines
Inspecting, checking, servicing and repairing opposed and radial engines and reciprocating engine installations
Installing, troubleshooting and removing reciprocating engines

Turbine Engines
Overhauling turbine engines
Inspecting, checking, servicing and repairing turbine engine installations
Installing, troubleshooting and removing turbine engines

Engine Inspection
Performing powerplant conformity and airworthiness inspection

CERTIFICATE OF COMPETENCY

This is to Certify that

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of

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has successfully mastered the competencies required to perform the job of

ASSEMBLER, AIRCRAFT POWERPLANT

_____

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The student named on this certificate has demonstrated mastery of the following unit level competencies required to perform the job of Assembler, Aircraft Powerplant.

ASSEMBLER, AIRCRAFT POWERPLANT
(D.O.T. 806.381-022)

Mathematics
Extracting roots and raising numbers to a given power
Determining areas and volumes of various geometrical shapes
Solving ratio, proportion and percentage problems
Performing algebraic operations involving addition, subtraction, multiplication and division of positive and negative numbers

Aircraft Drawings
Using drawings, symbols and schematic diagrams
Drawing sketches of repairs and alterations
Using blueprint information
Using graphs and charts

Basic Electricity
Determining the relationship of voltage, current and resistance in electrical circuits
Measuring voltage, current, resistance, continuity and leakage
Measuring capacitance and inductance
Calculating and measuring electrical power
Reading and interpreting electrical circuit diagrams
Inspecting and servicing batteries
Overhauling aircraft electrical components

Fluid Lines and Fittings
Fabricating and installing rigid flexible fluid lines and fittings

Materials and Processes
Performing precision measurements
Identifying and selecting aircraft hardware and materials
Performing basic heat-treating processes
Performing penetrant, chemical etching and magnetic particle inspections
Inspecting and checking welds
Identifying and selecting appropriate non-destructive testing methods

Cleaning and Corrosion Control
Identifying and selecting cleaning materials
Performing aircraft cleaning and corrosion control

Ground Operation and Servicing
Identifying and selecting fuels
Starting, ground operating, moving, servicing and securing aircraft

Maintenance Publications
Selecting and using FAA and manufacturer's aircraft maintenance specifications, data sheets, manuals, publications and related Federal Aviation Regulations
Reading technical data

Mechanic Privileges And Limitations
Exercising mechanic privileges within the limitations prescribed by FAR 65

Maintenance Forms and Records
Writing description of aircraft condition and work performed
Completing required maintenance forms, records and inspection reports

Aircraft Weight and Balance
Weighing aircraft
Performing complete weight and balance check and recording data

Lubrication Systems
Identifying and selecting lubricants

Propellers
Installing, troubleshooting and removing propellers
Identifying and selecting propeller lubricants

Reciprocating Engines
Installing, troubleshooting and removing reciprocating engines

Turbine Engines
Installing, troubleshooting and removing turbine engines

Engine Inspection
Performing powerplant conformity and airworthiness

V-26

CERTIFICATE OF COMPETENCY

This is to Certify that

_____

of

_____

has successfully mastered the competencies required to perform the job of

ASSEMBLER, AIRCRAFT STRUCTURES AND SURFACES

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The student named on this certificate has demonstrated mastery of the following unit level competencies required to perform the job of Assembler, Aircraft Structures and Surfaces.

ASSEMBLER, AIRCRAFT STRUCTURES AND SURFACES
(D.O.T. 806.381-026)

Mathematics
Extracting roots and raising numbers to a given power
Determining areas and volumes of various geometrical shapes
Solving ratio, proportion and percentage problems
Performing algebraic operations involving addition, subtraction, multiplication and division of positive and negative numbers

Aircraft Drawings
Using drawings, symbols and schematic diagrams
Drawing sketches of repairs and alterations
Using blueprint information
Using graphs and charts

Basic Electricity
Determining the relationship of voltage, current and resistance in electrical circuits
Measuring voltage, current, resistance, continuity and leakage
Measuring capacitance and inductance
Calculating and measuring electrical power
Reading and interpreting electrical circuit diagrams
Inspecting and servicing batteries
Overhauling aircraft electrical components

Fluid Lines and Fittings
Fabricating and installing rigid flexible fluid lines and fittings

Materials and Processes
Performing precision measurements
Identifying and selecting aircraft hardware and materials
Performing basic heat-treating processes
Performing penetrant, chemical etching and magnetic particle inspections
Inspecting and checking welds
Identifying and selecting appropriate non-destructive methods

Cleaning and Corrosion Control
Identifying and selecting cleaning materials
Performing aircraft cleaning and corrosion control

Ground Operation and Servicing
Identifying and selecting fuels
Starting, ground operating, moving, servicing and securing aircraft

Maintenance Publications
Selecting and using FAA and manufacturer's aircraft maintenance specifications, data sheets, manuals, publications and related Federal Aviation Regulations
Reading technical data

Mechanic Privileges and Limitations
Exercising mechanic privileges within the limitations prescribed by FAR 65

Maintenance Forms and Records
Writing description of aircraft condition and work performed
Completing required maintenance forms, records and inspection reports

Aircraft Weight and Balance
Weighing aircraft
Performing complete weight and balance check and recording data

Wood Structures
Identifying wood defects
Inspecting wood structures
Servicing and repairing wood structures

Fabric Covering
Selecting and applying fabric and fiberglass
Inspecting, testing and repairing fabric and fiberglass

Sheet Metal Structures
Installing conventional rivets
Installing special rivets and fasteners
Handforming, laying out and bending sheet metal
Inspecting and repairing sheet metal structures
Inspecting bonded structures
Inspecting and repairing plastics, honeycomb and laminated structures
Inspecting, checking, servicing and repairing windows, doors and interior furnishings

Welding
Soldering, brazing and arc welding steel
Fabricating tubular structures

Assembly and Rigging
Rigging fixed wing aircraft
Rigging rotary wing aircraft
Checking alignment of structures
Assembling aircraft
Balancing and rigging movable surfaces
Jacking aircraft

Engine Inspection
Performing powerplant conformity and airworthiness inspection

V-28

GROUP PROGRESS CHART

NAME	UNITS/TASKS																					

V-29

SECTION VI

FACILITIES

SECTION VI

Section VI Content List

Group Instruction Facilities
Individualized Instruction Facilities

The facility layouts on the following pages are presented to aid in arranging the classroom and laboratory for efficient instruction. The school administration and program instructor must determine an arrangement that best fits the needs of the students by determining the most efficient use of resources available to them not only in the laboratory, but also in the Learning Resource Center settings.

FACILITY LAYOUTS

The layouts on the following pages illustrate how facilities for group and individualized instructional programs may be planned and set up.

Each instructional approach has two important physical areas. These are (1) the laboratory (work) area and classroom for group instruction and (2) the laboratory (work) area and learning resource center (LRC) for individualized instruction.

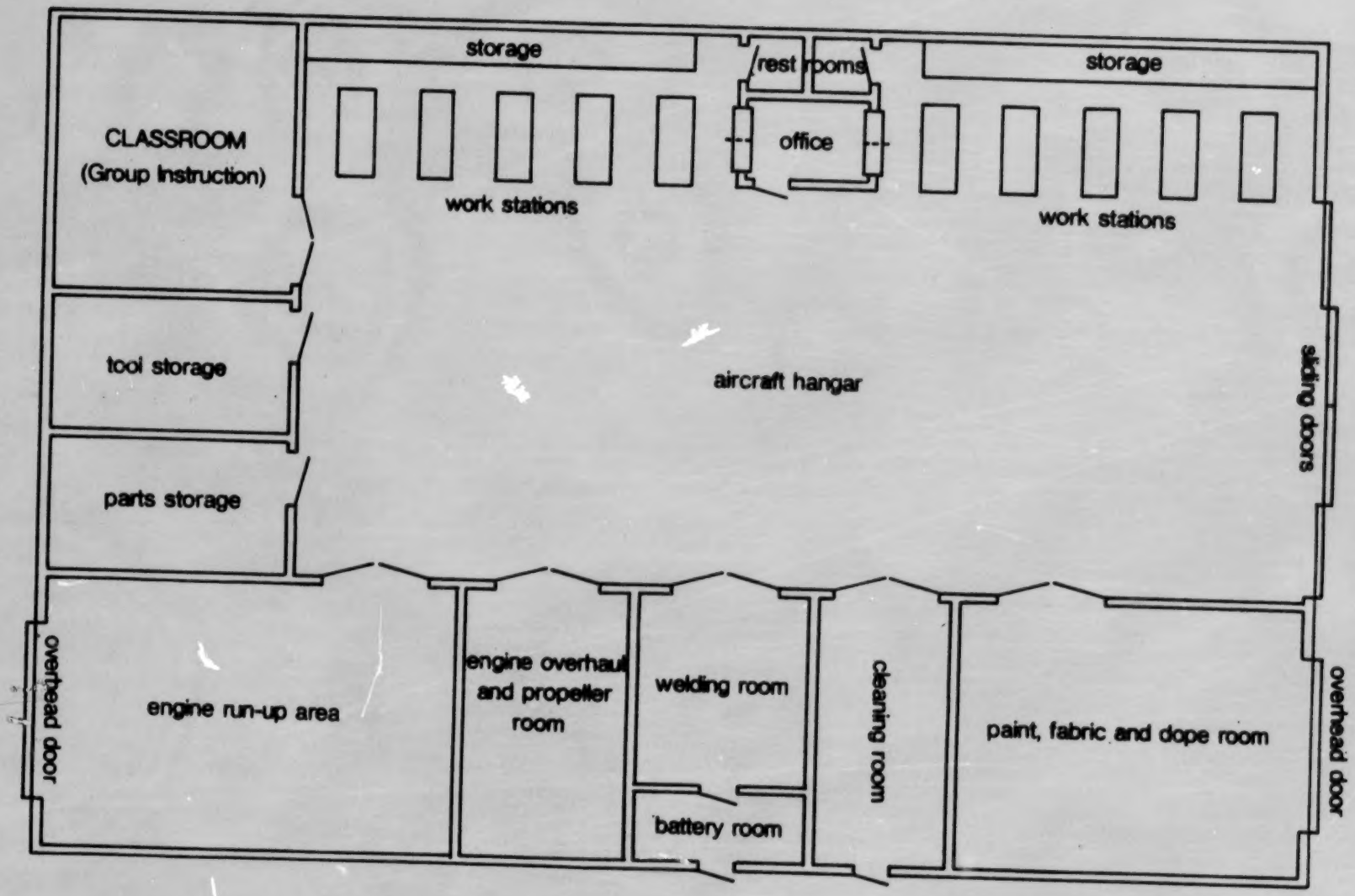
The instructional setting for group instruction is based on that of a traditional classroom. This approach is easily set up and includes little or no modifications. The primary modes of learning are instructor lectures, occasional use of audiovisual aids and student participation. Ideally, all students progress at the same pace.

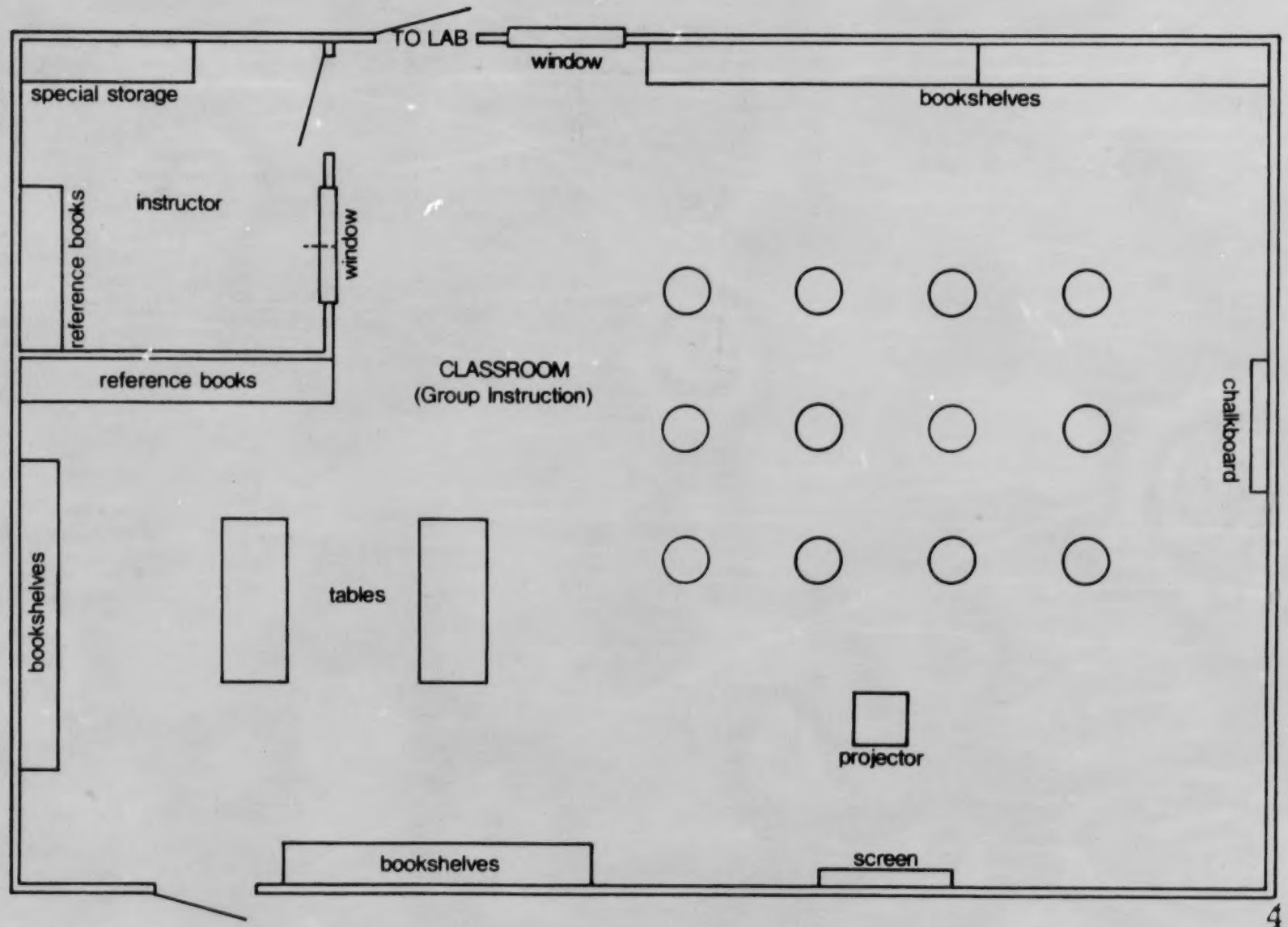
The instructional setting for individual instruction is designed to facilitate a student self-paced progression of learning. The LRC requires careful planning in utilizing available space. When planning to install an individual instruction program in an area not originally designed for this approach, the instructional setting may need modifications. Desks may be replaced with study carrels to allow students to simultaneously participate in a variety of learning activities. A group session area for small group gatherings should also be included. Because the instructor and students rarely meet together as a group, a bulletin board becomes a vital communication device in an LRC. It can be used to post announcements and such instructional information as group progress charts, assignments, positions available in the industry

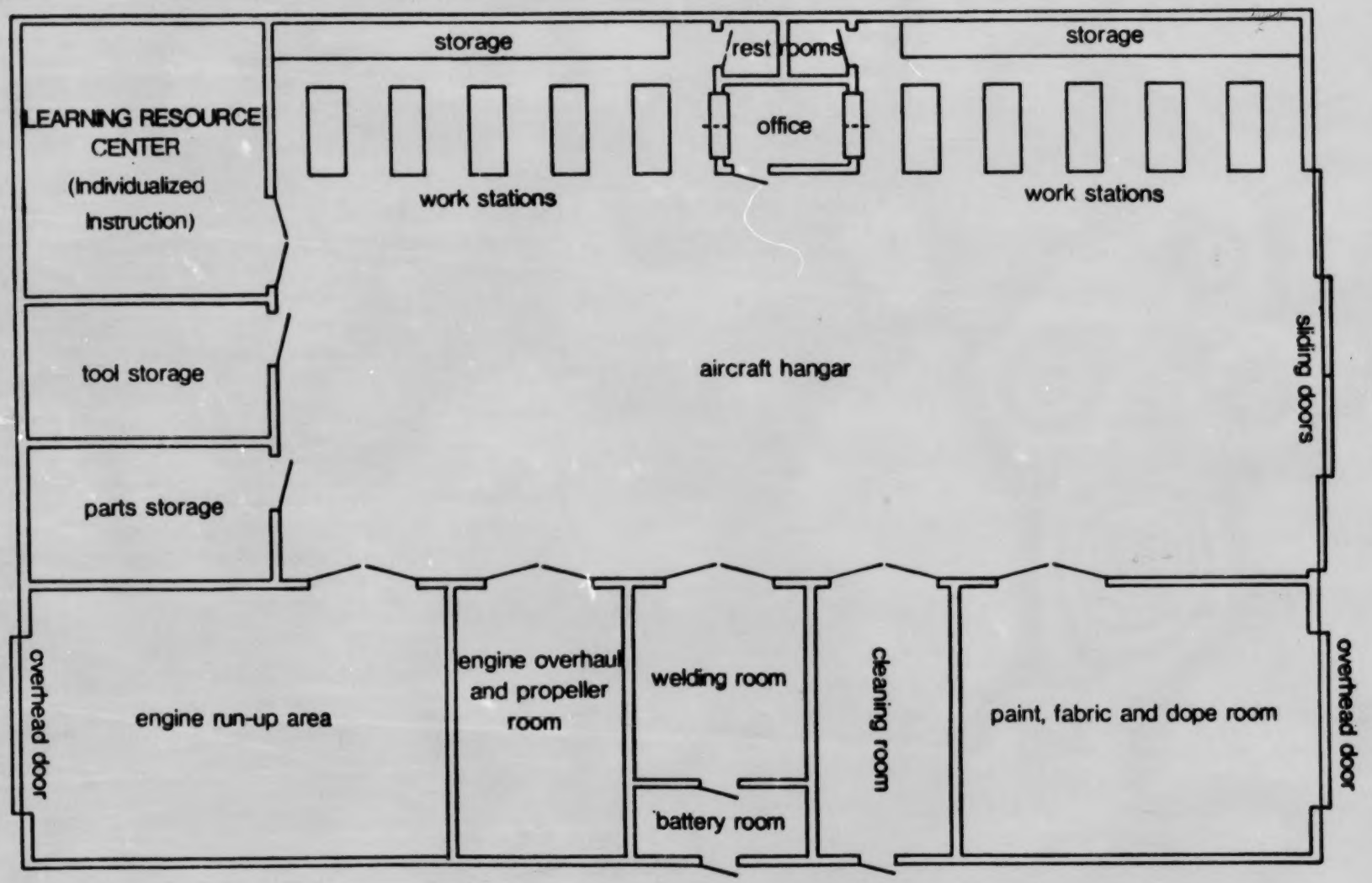
and safety rules.

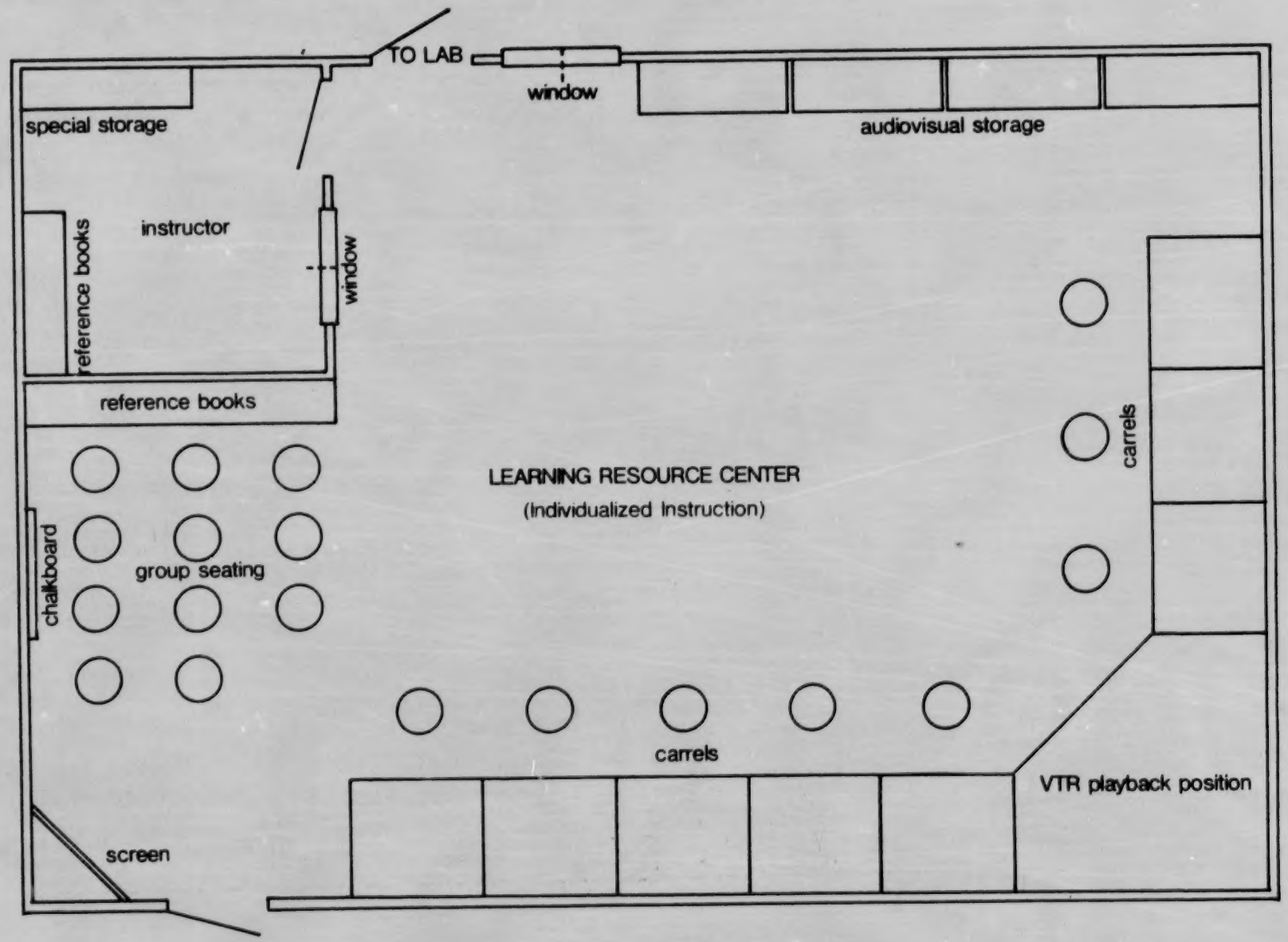
A variety of references, resources and media equipment should be made available to the student. Therefore, an adequate amount of storage area should be included in planning the LRC. Every specific school and department has unique physical layout characteristics and problems. Through innovation, these features may be transformed into LRC advantages rather than disadvantages.

The manner in which the laboratory (work) area is planned and set up need not be affected by the type of instructional approach used by an instructor; it could/will be the same. Some major concerns in the laboratory are: 1) the instructor must always have a clear line of sight to each and every workstation, 2) tools must be accessible to students, but under the control of the instructor and 3) all supplies and materials required for the day's activities must be on hand and ready to use.


CLASSROOM
(Group Instruction)
storage
rest rooms
storage
office
work stations
work stations
tool storage
aircraft hangar
sliding doors
parts storage
overhead door
engine run-up area
engine overhaul and propeller room
welding room
cleaning room
paint, fabric and dope room
overhead door
battery room


TO LAB
window
special storage
bookshelves
instructor
reference books
window
reference books
CLASSROOM
(Group Instruction)
chalkboard
bookshelves
tables
projector
bookshelves
screen


storage
rest rooms
storage
LEARNING RESOURCE CENTER (Individualized Instruction)
office
work stations
work stations
tool storage
aircraft hangar
sliding doors
parts storage
overhead door
engine run-up area
engine overhaul and propeller room
welding room
cleaning room
paint, fabric and dope room
overhead door
battery room


TO LAB
window
special storage
audiovisual storage
instructor
reference books
window
reference books
LEARNING RESOURCE CENTER
(Individualized Instruction)
carrels
chalkboard
group seating
carrels
VTR playback position
screen

APPENDIX A

Resources

RESOURCES

This appendix contains the instructional resource matrix, unit guide reference, additional instructional materials, a list of FAA publications and resource addresses.

The instructional resource matrix lists the audiovisuals, textbooks and student manuals for each task referenced on the unit guide sheets. The audiovisual format is identified by the following symbols: filmstrip (FS), slide/script (SS), slide/tape (ST), 16mm movie film (MF), transparency (TR), video tape (VT) and filmloop (FL). The producer, title and number of the A/V is also given.

The unit guide bibliography lists textbooks, audiovisuals, student manuals and evaluation materials cited in the unit guides section.

The additional instructional materials is a compilation of textbooks and audiovisuals not included in the unit guides but beneficial to educators.

The FAA publications sections presents a current listing of FAR's and procedures, airworthiness directives, advisory circulars and educational and career materials. This information may be obtained by contacting the FAA.

Resources addresses for <u>all</u> references concludes this appendix.

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
GA-01 Extracting roots and raising numbers to a given power (Level 1)		FAA: AC65-9A: General Handbook	Oregon: Individualized Math Problems in Aviation Mechanics
GA-02 Determining areas and volumes of various geometrical shapes (Level 2)	Aviation Maintenance Publishers: "Measurement of Area and Volume," ITP-G-100 (VT)	FAA: AC65-9A: General Handbook; Aviation Maintenance Publishers: Applied Science for the Aviation Technician	Oregon: Individualized Math Problems in Aviation Mechanics
GA-03 Solving ratio, proportion and percentage problems (Level 3)		FAA: AC65-9A: General Handbook	Oregon: Individualized Math Problems in Aviation Mechanics
GA-04 Performing algebraic operations involving addition, subtraction, multiplication and division of positive and negative numbers (Level 3)		FAA: AC65-9A: General Handbook	Oregon: Individualized Math Problems in Aviation Mechanics
GA-05 Using drawings, symbols and schematic diagrams (Level 2)	Aviation Maintenance Publishers: "Aircraft Drawings," ITP-G-118 (VT)	FAA: AC65-9A: General Handbook; McGraw-Hill: Aircraft Basic Science	
GA-06 Drawing sketches of repairs and alterations (Level 3)		FAA: AC65-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; FAA: AC43.13-2A: Acceptable Methods, Techniques and Practices - Aircraft Alterations; McGraw-Hill: Aircraft Basic Science	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
GA-07 Using blueprint information (Level 3)		FAA: AC65-9A: General Handbook; McGraw-Hill: Aircraft Basic Science	
GA-08 Using graphs and charts (Level 3)		FAA: AC65-9A: General Handbook; FAA, AC43-13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; FAA AC43-13-2A: Acceptable Methods, Techniques and Practices - Aircraft Alterations; McGraw-Hill: Aircraft Basic Science	
GA-09 Using the principles of simple machines: sound, fluid and heat dynamics (Level 2)	Aviation Maintenance Publishers: "Energy, Work, Power and Force," ITP-G-101 (VT); "Newton's Laws of Motion," ITP-G-107 (VT); "Temperature, Pressure and Fluids," ITP-G-108, Part 1 & 2 (VT); "Bernouilli's Principle - Why an Airplane Flies," ITP-G-109 (VT); "Sound and It's Effects," ITP-G-110 (VT)	FAA: AC65-9A: General Handbook; McGraw-Hill: Aircraft Basic Science; Aviation Maintenance Publishers: Applied Science for the Aviation Technician	
GA-10 Determining the relationship of voltage, current and resistance in electrical circuits (Level 3)	Aviation Maintenance Publishers: "Electron Theory" ITP-G-111 (VT); "Sources of Electrical Energy," ITP-G-114 (VT); "Basic Electricity," EA-BE (FS)	FAA: AC65-9A: General Handbook; McGraw-Hill: Electricity and Electronics for Aerospace Vehicles; McGraw-Hill: Aircraft Basic Science; Aviation Maintenance Publishers: Basic Electricity for A&P Mechanics	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
GA-11 Measuring voltage, current, resistance, continuity and leakage (Level 3)	Aviation Maintenance Publishers: "Units of Electrical Measurement," IPT-G-125 (VT); "D.C. Circuit Elements," ITP-G-126 (VT); "D.C. Circuit Arrangement," ITP-G-127 (VT)	FAA: AC65-9A: General Handbook; McGraw-Hill: Electricity and Electronics for Aerospace Vehicles; McGraw-Hill: Aircraft Basic Science; Aviation Maintenance Publishers: Basic Electricity for A&P Mechanics	
GA-12 Measuring capacitance and inductance (Level 1)	Aviation Maintenance Publishers: "Principles of Alternating Current," ITP-G-116 (VT); "Inductance, Capacitance and Impedance," ITP-G-117 (VT)	FAA: AC65-9A: General Handbook; McGraw-Hill: Electricity and Electronics for Aerospace Vehicles; Aviation Maintenance Publishers: Basic Electricity for A&P Mechanics	
GA-13 Calculating and measuring electrical power (Level 2)		FAA: AC65-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Electricity and Electronics for Aerospace Vehicles; Aviation Maintenance Publishers: Basic Electricity for A&P Mechanics	
GA-14 Reading and interpreting electrical circuit diagrams		FAA: AC65-9A: General Handbook; McGraw-Hill: Electricity and Electronics for Aerospace Vehicles; Aviation Maintenance Publishers: Basic Electricity for A&P Mechanics	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
GA-15 Inspecting and servicing batteries (Level 3)	Aviation Maintenance Publishers: "Aircraft Batteries," EA-AB (FS); "Theory and Testing of Lead Acid Batteries," ITP-G-128 (VT); "Theory and Testing of Nickel-Cadmium Batteries," ITP-G-115 (VT)	FAA: AC65-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Electricity and Electronics for Aerospace Vehicles; Aviation Maintenance Publishers: Basic Electricity for A&P Mechanics	
GA-16 Overhauling aircraft electrical components (Level 2)	Prestolite: "Aircraft Alternators," (ST)	FAA: AC65-9A: General Handbook; McGraw-Hill: Electricity and Electronics for Aerospace Vehicles	
GA-17 Fabricating and installing rigid and flexible fluid lines and fittings (Level 3)		FAA: AC65-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Basic Science	
GA-18 Performing precision measurements (Level 3)	Aviation Maintenance Publishers: "Measuring and Layout Tools," ITP-G-131 (VT); "Precision Measuring Instruments-The Micrometer Caliper," ITPS-119 (VT); "Precision Measuring Instruments-The Vernier Caliper," ITPS-120 (VT)	FAA: AC65-9A: General Handbook	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
GA-19 Identifying and selecting aircraft hardware and materials (Level 3)	Aviation Maintenance Publishers, "Identification and Application of Aircraft Hardware," ITP-G-129 (VT); "Identification of Metals," ITP-G-132 (VT); "Non-Metallic Structural Materials," ITP-G-133 (VT)	FAA: AC65-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Basic Science	
GA-20 Performing basic heat-treating processes (Level 2)		FAA: AC54-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair	
GA-21 Performing penetrant, chemical etching and magnetic particle inspections (Level 2)	Aviation Maintenance Publishers, "Non-destructive Inspection-Dye Penetrant," ITP-G-135 (VT); "Non-destructive Inspection-Magnetic Particle," ITP-G-136 (VT)	FAA: AC65-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Basic Science	
GA-22 Inspecting and checking welds (Level 3)		FAA: AC65-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair	
GA-23 Identifying and selecting appropriate non-destructive testing methods (Level 1)		FAA: AC65-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; FAA: AC43-3: Non-Destructive Testing in Aircraft;	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
		FAA: AC43-7: Ultrasonic Testing for Aircraft	
GA-24 Identifying and selecting cleaning materials (Level 3)	Aviation Maintenance Publishers: "Corrosion Detection, Removal, Treatment and Protection," ITP-G-134 (VT); "Aircraft Corrosion Control," EA-CC (FS)	FAA: AC65-9A: General Handbook; Aviation Maintenance Publishers: Aircraft Corrosion Control	
GA-25 Performing aircraft cleaning and corrosion control (Level 3)	Aviation Maintenance Publishers: "Aircraft Corrosion Control," EA-CC (FS)	FAA: AC65-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Basic Science	
GA-26 Identifying and selecting fuels (Level 2)		FAA: AC65-9A: General Handbook; FAA: AC20-92 Anti-Icing Additives to Reduce Icing Problems in Aviation Gasoline	
GA-27 Starting, ground operating, moving, servicing and securing aircraft (Level 2)	Aviation Maintenance Publishers: "Flight Line Safety and Aircraft Ground Handling," ITP-G-138 (VT); "Aircraft Fueling," ITP-G-139 (VT)	FAA: AC65-9A: General Handbook; FAA: AC00-34A: Aircraft Ground Handling and Servicing; FAA: AC20-43C: Aircraft Fuel Control; McGraw-Hill: Aircraft Basic Science	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
GA-28 Selecting and using FAA and manufacturer's aircraft maintenance specifications, data sheets, manuals, publications and related Federal Aviation Regulations (Level 3)		FAA: AC65-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; Aviation Maintenance Publishers: Federal Aviation Regulations Handbook for Aviation Mechanics, EA-FAR-IC; McGraw-Hill: Aircraft Basic Science	
GA-29 Reading technical data (Level 3)		FAA: AC65-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; Aviation Maintenance Publishers: Federal Aviation Regulations Handbook for Aviation Mechanics, EA-FAR-IC; Mc-Graw-Hill: Aircraft Basic Science	
GA-30 Exercising mechanic privileges within the limitations prescribed by FAR 65 (Level 3)		FAA: AC65-9A: General Handbook; Aviation Maintenance Publishers: Federal Aviation Regulations Handbook for Aviation Mechanics, EA-FAR-IC; McGraw-Hill: Aircraft Basic Science; Aviation Maintenance Publishers: Understanding Federal Air Regulations	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
GA-31 Writing description of aircraft condition and work performed (Level 3)		FAA: AC65-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; Aviation Maintenance Publishers: Federal Aviation Regulations Handbook for Aviation Mechanics, EA-FAR-IC; McGraw-Hill: Aircraft Basic Science	
GA-32 Completing required maintenance forms, records and inspection reports (Level 3)	Aviation Maintenance Publishers: "Inspection and Maintenance Records," EA-IAR (FS)	FAA: AC65-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; Aviation Maintenance Publishers: Federal Aviation Regulations Handbook for Aviation Mechanics, EA-FAR-IC; McGraw-Hill: Aircraft Basic Science; Aviation Maintenance Publishers: Aircraft Inspection and Maintenance Records	
GA-33 Weighing aircraft	Aviation Maintenance Publishers: "Aircraft Weight and Balance," EA-BAL (FS); "Importance and Principles of Aircraft Weight and Balance," ITP-G-123 (VT)	FAA: AC65-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Basic Science; Aviation Maintenance Publishers: Aircraft Weight and Balance	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
GA-34 Performing complete weight and balance check and recording data (Level 3)	Aviation Maintenance Publishers: "Center of Gravity and Loading Computations," ITP-G-124 (VT); "Aircraft Weight and Balance," EA-BAL (FS)	FAA: AC65-9A: General Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Basic Science; Aviation Maintenance Publishers: Aircraft Weight and Balance	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
AF-01 Identifying wood defects (Level 2)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Maintenance and Repair	
AF-02 Inspecting wood structures (Level 2)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Maintenance and Repair	
AF-03 Servicing and repairing wood structures (Level 1)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Maintenance and Repair	
AF-04 Selecting and applying fabric and fiberglass (Level 1)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Maintenance and Repair; Aviation Maintenance Publishers: Aircraft Fabric Covering	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
AF-05 Inspecting, testing and repairing fabric and fiberglass (Level 3)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Maintenance and Repair; Aviation Maintenance Publishers: Aircraft Fabric Covering	
AF-06 Applying trim, letters and touch-up paint (Level 1)		FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Airframe Maintenance and Repair; Aviation Maintenance Publishers: Aircraft Painting and Finishing	
AF-07 Identifying and selecting aircraft finishing materials (Level 2)	Aviation Maintenance Publishers: "Aircraft Painting," EA-AP (FS)	FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair; Aviation Maintenance Publishers: Aircraft Painting and Finishing	
AF-08 Applying paint and dope (Level 2)	Aviation Maintenance Publishers: "Aircraft Painting Tips," EA-APT (FS)	FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair; Aviation Maintenance Publishers: Aircraft Painting and Finishing	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
AF-09 Inspecting finishes and identifying defects (Level 2)		FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair; Aviation Maintenance Publishers: Aircraft Painting and Finishing	
AF-10 Installing conventional rivets (Level 3)	Aviation Maintenance Publishers: "Rivet Identification," ITP-S-113 (VT)	FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; Aviation Maintenance Publishers: Aircraft Sheet Metal Construction and Repair	
AF-11 Installing special rivets and fasteners (Level 2)		FAA: AC65-15A: Airframe Handbook, FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; Aviation Maintenance Publishers: Aircraft Sheet Metal Construction and Repair	
AF-12 Hand forming, laying out and bending sheet metal (Level 3)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair McGraw-Hill: Aircraft Maintenance and Repair; Aviation Maintenance Publishers:	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
		Aircraft Sheet Metal Construction and Repair	
AF-13 Inspecting and repairing sheet metal structures (Level 3)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Maintenance and Repair; Aviation Maintenance Publishers: Aircraft Sheet Metal Construction and Repair	
AF-14 Inspecting bonded structures (Level 2)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; Aviation Maintenance Publishers: Aircraft Bonded Structure; McGraw-Hill: Aircraft Maintenance and Repair	
AF-15 Inspecting and repairing plastics, honeycomb and laminated structures (Level 2)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; Aviation Maintenance Publishers: Aircraft Bonded Structure; McGraw-Hill: Aircraft Maintenance and Repair	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
AF-16 Inspecting, checking, servicing and repairing windows, doors and interior furnishings (Level 2)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Maintenance and Repair	
AF-17 Soldering, brazing and arc welding steel (Level 2)	Aviation Maintenance Publishers: "Oxyacetylene Welding Series," EA-WBS (VT)	FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Maintenance and Repair; Aviation Maintenance Publishers: Welding Guidelines	
AF-18 Fabricating tubular structures (Level 1)	Aviation Maintenance Publishers: "Oxyacetylene Welding Series," EA-WBS (VT)	FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; Aviation Maintenance Publishers: Welding Guidelines; McGraw-Hill: Aircraft Maintenance and Repair	
AF-19 Soldering stainless steel (Level 2)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Maintenance and Repair	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
AF-20 Welding stainless steel and aluminum (Level 2)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Maintenance and Repair; Aviation Maintenance Publishers: Welding Guidelines	
AF-21 Welding magnesium and titanium (Level 1)		FAA: AC65-15A: Airframe Handbook	
AF-22 Rigging fixed wing aircraft (Level 2)	Sanderson: "Science of Flight," (FS); FAA Film Service: "How Airplanes Fly," #11132 (MF)	FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair	
AF-23 Rigging rotary wing aircraft (Level 1)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; Aviation Maintenance Publishers: Fundamentals of Helicopter Maintenance	
AF-24 Checking alignment of structures (Level 2)		FAA: AC65-15A:. Airframe Handbook	
AF-25 Assembling aircraft (Level 2)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair;	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
		Aviation Maintenance Publishers: Aviation Maintenance Handbook and Standard Hardware Digest	
AF-26 Balancing and rigging movable surfaces (Level 3)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Maintenance and Repair	
AF-27 Jacking aircraft (Level 3)		FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair	
AF-28 Performing 100-hour or annual inspection (Level 3)	Aviation Maintenance Publishers: "Inspection and Maintenance Records," EA-IAR (FS); "Aircraft 100 Hour/Annual Inspections," EA-HAS (FS)	FAA: AC65-9A: General Handbook; FAA: AC65-15A: Airframe Handbook	
AF-29 Installing, checking and servicing airframe electrical wiring, controls, switches, indicators and protective devices (Level 3)		FAA: AC65-9A: General Handbook; FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Electricity and Electronics for Aerospace Vehicles	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
AF-30 Inspecting, checking, troubleshooting, servicing, and repairing alternating current and direct current electrical systems (Level 3)		FAA: AC65-15A: Airframe Handbook; FAA: AC65-9A: General Handbook; McGraw-Hill: Electricity and Electronics for Aerospace Vehicles; Aviation Maintenance Publishers: D.C. Circuits	
AF-31 Repairing aircraft electrical system components (Level 2)		FAA: AC65-15A: Airframe Handbook; FAA: AC65-9A: General Handbook; FAA: AC-43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Electricity and Electronics for Aerospace Vehicles	
AF-32 Identifying and selecting hydraulic fluids (Level 3)		FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair; Aviation Maintenance Publishers: Aircraft Hydraulic Systems	
AF-33 Repairing hydraulic and penumatic power system components (Level 2)	Aviation Maintenance Publishers: "Aircraft Pneumatic Systems," EA-APS, Part I (FS)	FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair; Aviation Maintenance Publishers: Aircraft Hydraulic Systems	

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TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
AF-34 Inspecting, checking, servicing, troubleshooting and repairing hydraulic and pneumatic power systems (Level 3)	Aviation Maintenance Publishers: "Aircraft Pneumatic Systems," EA-APS, Part II, (FS)	FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair; Aviation Maintenance Publishers: Aircraft Hydraulic Systems	
AF-35 Inspecting, checking, servicing and repairing landing gear, retraction systems, shock struts, brakes, wheels, tires and steering systems (Level 3)	Aviation Maintenance Publishers: "Aircraft Wheels and Brakes," EA-AWB (FS); "Aircraft Tubes and Tires," EA-ATT (FS); "Oleo Strut Servicing," ITP-S-102 (VT); Cessna Aircraft: "Multiple Engine Landing Gear," SPAT-5290-19 (FS)	FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; Aviation Maintenance Publishers: Aircraft Wheels and Brakes and Antiskid Systems: Aircraft Tires and Tubes	
AF-36 Inspecting, checking and servicing speed and takeoff-warning systems and antiskid electrical brake controls (Level 1)		FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair	
AF-37 Inspecting, checking, troubleshooting, servicing and repairing landing gear position indicating and warning systems (Level 3)		FAA: AC-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair	
AF-38 Installing instruments (Level 2)		FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair; McGraw-Hill: Electricity and Electronics for Aerospace	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
		Vehicles; Aviation Maintenance Publishers: Aircraft Instrument Systems	
AF-39 Inspecting, checking, servicing, troubleshooting and repairing heading, speed, altitude, time, attitude temperature, pressure and position indicating systems (Level 2)		FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair; McGraw-Hill: Electricity and Electronics for Aerospace Vehicles; Aviation Maintenance Publishers: Aircraft Instrument Systems	
AF-40 Inspecting, checking, servicing, troubleshooting and repairing aircraft fuel systems (Level 3)		FAA: AC65-9: General Handbook; Aviation Maintenance Publishers: Federal Aviation Regulations Handbook for Aviation Mechanics; McGraw-Hill: Aircraft Maintenance and Repair	
AF-41 Repairing aircraft fuel systems components (Level 2)		FAA: AC65-9a: General Handbook; McGraw-Hill: Aircraft Maintenance and Repair	
AF-42 Inspecting and repairing fuel quantity indicating systems (Level 2)		FAA: AC65-9A: General Handbook	
AF-43 Inspecting, checking and repairing pressure fueling systems (Level 1)		FAA: AC65-9A: General Handbook; McGraw-Hill: Aircraft Maintenance and Repair	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING		INSTRUCTIONAL MATERIAL REFERENCES		
		Audiovisuals	Textbooks	Student Materials
AF-44	Checking and servicing fuel dump systems (Level 1)		FAA: AC65-9A: General Handbook; McGraw-Hill: Aircraft Maintenance and Repair	
AF-45	Performing fuel management transfer and defueling (Level 1)		FAA: AC65-9A: General Handbook; McGraw-Hill: Aircraft Maintenance and Repair	
AF-46	Troubleshooting, servicing and repairing pressure and temperature warning systems (Level 2)		FAA: AC65-9A: General Handbook; McGraw-Hill: Aircraft Maintenance and Repair	
AF-47	Inspecting, checking and servicing autopilot and approach control systems (Level 1)	Aviation Maintenance Publishers: "Basic Electronics and Radio Installation," EA-BEM, Part II (FS)	FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Electricity and Electronics for Aerospace Vehicles	
AF-48	Inserting, checking and servicing aircraft electronic communication and navigation systems (Level 1)	Aviation Maintenance Publishers: "Basic Electronics and Radio Installation," EA-BEM, (FS)	FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Electricity and Electronics for Aerospace Vehicles	
AF-49	Inspecting and repairing antenna and electronic equipment installations (Level 2)		FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; FAA: AC43.13-2A: Acceptable Methods, Techniques and Practices - Aircraft Alterations	

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TASK LISTING		INSTRUCTIONAL MATERIAL REFERENCES		
		Audiovisuals	Textbooks	Student Materials
AF-50	Inspecting, checking, troubleshooting, servicing and repairing heating, tooling air conditioner and pressurization systems (Level 1)	Aviation Maintenance Publishers: "Aircraft Air Conditioning Systems," EA-AAS (FS)	FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair; Aviation Maintenance Publishers: Aircraft Air Conditioning Systems	
AF-51	Inspecting, checking, troubleshooting, servicing and repairing oxygen systems (Level 2)	Aviation Maintenance Publishers: "Aircraft Oxygen Systems," EA-AOS (FS)	FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Maintenance and Repair	
AF-52	Repairing heating cooling, air conditioning, pressurization and oxygen system components (Level 1)	Aviation Maintenance Publishers: "Aircraft Air Conditioning Systems," EA-ACC (FS); "Aircraft Oxygen Systems," EA-AOS (FS)	FAA: AC65-15A: Airframe Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Maintenance and Repair	
AF-53	Inspecting, checking, troubleshooting, servicing and repairing airframe ice and rain control systems (Level 2)	Aviation Maintenance Publishers: "Aircraft Pneumatic Systems," EA-APS (FS)	FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair	
AF-54	Inspecting, checking and servicing smoke and carbon monoxide detection systems (Level 1)		FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
AF-55 Inspecting, checking, servicing, troubleshooting and repairing aircraft fire detection and extinguishing systems (Level 3)		FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Maintenance and Repair	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
PP-01 Identifying and selecting lubricants (Level 2)	Aviation Maintenance Publishers: "Aircraft Reciprocating Engines," EA-ARE (FS)	FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	
PP-02 Inspecting, checking, servicing, troubleshooting and repairing engine lubrication systems (Level 3)		FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants; Aviation Maintenance Publishers: Federal Aviation Regulations Handbook for Aviation Mechanics; Aviation Maintenance Publishers: Aircraft Gas Turbine Powerplants	Aviation Maintenance Publishers: Aircraft Gas Turbine Powerplant Workbook
PP-03 Repairing engine lubrication system components (Level 2)		FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	
PP-04 Inspecting, checking, servicing, troubleshooting and repairing engine fuel systems (Level 3)		FAA: AC65-9A: General Handbook; FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants; Aviation Maintenance Publishers: Federal Aviation Regulations Handbook for Aircraft Mechanics; Aviation Maintenance Publishers: Aircraft Gas Turbine Powerplants	Aviation Maintenance Publishers: Aircraft Gas Turbine Powerplant Workbook
PP-05 Repairing engine fuel system components (Level 2)		FAA: AC65-9A: General Handbook; Aviation Maintenance Publishers: Aircraft Gas Turbine Powerplants	Aviation Maintenance Publishers: Aircraft Gas Turbine Powerplant Workbook

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TASK LISTING		INSTRUCTIONAL MATERIAL REFERENCES		
		Audiovisuals	Textbooks	Student Materials
PP-06	Inspecting, checking, servicing, troubleshooting and repairing reciprocating and turbine engine fuel metering systems (Level 1)	Aviation Maintenance Publishers: "Fuel Metering Systems," EA-FMS (FS); Cessna Aircraft Co.: "Fuel Injection Technical Training," SPA-73294-19 (FS)	FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants; Aviation Maintenance Publishers: Fuel Metering Systems	
PP-07	Overhauling carburetors (Level 2)	Aviation Maintenance Publishers: "Fuel Metering Systems," EA-FMS (FS)	FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	
PP-08	Repairing engine fuel metering system components (Level 2)	Aviation Maintenance Publishers: "Fuel Metering Systems," EA-FMS (FS)	FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants; Aviation Maintenance Publishers: Aircraft Fuel Metering System	
PP-09	Inspecting, checking and servicing water injection systems (Level 1)		FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	
PP-10	Inspecting, checking, troubleshooting, servicing and repairing engine ice and rain control systems (Level 2)		FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	
PP-11	Inspecting, checking, servicing and repairing heat exchangers and superchargers (Level 2)	Cessna Aircraft Company: "Turbo System Powerplants," SPA 72256-19 (FS)	FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
PP-12 Inspecting, checking, servicing and repairing carburetor air intake and induction manifold (Level 3)		FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	
PP-13 Inspecting, checking, troubleshooting, servicing and repairing engine cooling systems (Level 3)		FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	
PP-14 Repairing engine cooling system components (Level 2)		FAA: AC65-12A: Powerplant Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Powerplants	
PP-15 Inspecting, checking, troubleshooting, servicing and repairing engine exhaust systems (Level 3)		FAA: AC65-12A: Powerplant Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Powerplants	
PP-16 Repairing engine exhaust system components (Level 2)		FAA: AC65-12A: Powerplant Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Powerplants	

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TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
PP-17 Overhauling magneto and ignition harness (Level 2)	Aviation Maintenance Publishers: "Aircraft Ignition Systems," EA-IGS (FS); "Slick Magnetos," EA-SEM (FS); Cessna Aircraft Co.: "Magneto-600/4000 Series," SPA 71251-19 (FS)	FAA: AC65-15A: Airframe Handbook; McGraw-Hill: Aircraft Powerplants; Aviation Maintenance Publishers: Aircraft Ignition and Electrical Power Systems	
PP-18 Inspecting, checking, servicing, troubleshooting and repairing reciprocating and turbine engine ignition systems (Level 3)	Aviation Maintenance Publishers: "AC Sparkplug Care," EA-SPC (FS); "Time-Rite Indicator," EA-TRI (FS); Cessna Aircraft Company: "Spark Plug and Combustion Analysis," SPA-69283-19 (FS)	FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	
PP-19 Repairing engine ignition system components (Level 2)	Aviation Maintenance Publishers: "Constructing an Ignition Lead," ITPS-121 (VT); "Replacing the Slick Magneto," ITPS-122 (VT)	FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	
PP-20 Installing, checking and servicing engine electrical wiring, controls, switches, indicators and protective devices (Level 3)		FAA: AC65-12A: Powerplant Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Electricity and Electronics for Aerospace Vehicles	
PP-21 Repairing engine electrical system components (Level 2)	Prestolite Corp.: "Prestolite Alternators" (FS)	FAA: AC65-12A: Powerplant Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair;	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
		McGraw-Hill: Electricity and Electronics for Aerospace Vehicles	
PP-22 Inspecting, checking, servicing, troubleshooting and repairing engine temperature, pressure and RPM indicating systems (Level 3)		FAA: AC65-12A: Powerplant Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Powerplants; Aviation Maintenance Publishers: Aircraft Instrument Systems	
PP-23 Troubleshooting, servicing and repairing fluid rate of flow indicating systems (Level 2)		FAA: AC65-9A: General Handbook; McGraw-Hill: Aircraft Powerplants; Aviation Maintenance Publishers: Aircraft Instrument Systems	
PP-24 Inspecting, checking, servicing, troubleshooting and repairing engine fire detection and extinguishing systems (Level 3)		FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	
PP-25 Inspecting, checking, servicing and repairing fixed-pitch, constant-speed and feathering propellers and propeller governing systems (Level 3)	Aviation Maintenance Publishers: "Aircraft Propellers and Controls," EA-APC (FS)	FAA: AC65-12A: Powerplant Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Powerplants	

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TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
PP-26 Installing, troubleshooting and removing propellers (Level 3)	Aviation Maintenance Publishers: "Aircraft Propeller Care," EA-APV (VT)	FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	
PP-27 Inspecting, checking, servicing and repairing propeller synchronizing and ice control systems (Level 1)	Cessna Aircraft Co.: "Automatic Propeller Synchronization," SPA-67352-19 (FS)	FAA: AC65-12: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	
PP-28 Identifying and selecting propeller lubricants (Level 2)	Aviation Maintenance Publishers: "Aircraft Propeller Care," EA-APV (VT)	FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	
PP-29 Balancing propellers (Level 2)		FAA: AC65-12A: Powerplant Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Powerplants	
PP-30 Repairing propeller control system components (Level 2)	Aviation Maintenance Publishers: "Aircraft Propellers and Controls," EA-APC (FS)	FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants; Aviation Maintenance Publishers: Aircraft Propellers and Controls	
PP-31 Overhauling reciprocating engines (Level 2)	Aviation Maintenance Publishers: "Aircraft Reciprocating Engines," EA-ARE (FS); "The Mechanics Tool Box," ITPG-130 (VT); "Shop Safety and Fire Protection," ITPG-137 (VT)	FAA: AC65-12A: Powerplant Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Practices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Powerplants	

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TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Materials
PP-32 Inspecting and repairing reciprocating engines (Level 2)	Aviation Maintenance Publishers: "Continental Cylinder Replacement," ITP-S-103 (VT)	FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants; Aviation Maintenance Publishers: Aircraft Reciprocating Engines	
PP-33 Inspecting, checking, servicing and repairing opposed and radial engines and reciprocating engine installations (Level 3)	Aviation Maintenance Publishers: "Replacing the Slick Magneto," ITPS-122 (VT); "Time-Rite Indicator," EA-TRI (FS)	FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	
PP-34 Installing, troubleshooting and removing reciprocating engines (Level 3)		FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants	
PP-35 Overhauling turbine engines (Level 2)		FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants; Pratt and Whitney: Gas Turbine Engine; Aviation Maintenance Publishers: Aircraft Gas Turbine Powerplants	Aviation Maintenance Publishers: Aircraft Gas Turbine Workbook
PP-36 Inspecting, checking, servicing and repairing turbine engine installations (Level 2)		FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants; Pratt and Whitney: Gas Turbine Engine	

CURRICULUM AREA: AVIATION MECHANICS

TASK LISTING	INSTRUCTIONAL MATERIAL REFERENCES		
	Audiovisuals	Textbooks	Student Material
PP-37 Installing, troubleshooting and removing turbine engines (Level 2)		FAA: AC65-12A: Powerplant Handbook; McGraw-Hill: Aircraft Powerplants; Pratt and Whitney: Gas Turbine Engine	
PP-38 Performing powerplant conformity and airworthiness inspection (Level 3)	Aviation Maintenance Publishers: "Aircraft 100 Hour/Annual Inspections," EA-HAS (FS); "Inspection and Maintenance Records," EA-IAR (FS)	FAA: AC65-12A: Powerplant Handbook; FAA: AC43.13-1A: Acceptable Methods, Techniques and Pracrices - Aircraft Inspection and Repair; McGraw-Hill: Aircraft Powerplants; Aviation Maintenance Publishers: Federal Aviation Regulations Handbook for Aviation Mechanics	

UNIT GUIDE REFERENCES

Textbooks, audiovisual producers, student manuals and evaluation materials contained in the unit guide sheets are listed here. Addresses for the publishers may be found in the "Resource Addresses" which concludes this section.

TEXTBOOKS

Aviation Maintenance Publishers, Aircraft Air Conditioning Systems. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Bonded Structures. Basin, WY: Aircraft Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Corrosion Control. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Fabric Covering. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Fuel Metering Systems. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Gas Turbine Powerplants. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Hydraulic Systems. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Ignition and Electrical Power Systems. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Inspection and Maintenance Records. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Instrument Systems. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Painting and Finishing. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Propellers and Controls. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Reciprocating Engines. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Sheet Metal Construction and Repair. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Tires and Tubes. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Weight and Balance. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aircraft Wheel and Brakes and Anti-skid Systems. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Applied Science for the Aviation Technician. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Aviation Maintenance Handbook and Standard Hardware Digest. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Basic Electricity for A&P Mechanics. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, D.C. Circuits. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Federal Aviation Regulations Handbook for Aviation Mechanics. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Welding Guidelines. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Fundamentals of Helicopter Maintenance. Basin, WY: Aviation Maintenance Publishers.

Aviation Maintenance Publishers, Understanding Federal Air Regulations. Basin, WY: Aviation Maintenance Publishers.

FAA, AC00-34A: Aircraft Ground Handling and Servicing. Washington, D.C.: U.S. Government Printing Office.

FAA, AC20-92: Anti-icing Additives to Reduce Icing Problems in Aviation Gasoline. Washington, D.C.: U.S. Government Printing Office.

FAA, AC20-43C: Aircraft Fuel Control. Washington, D.C.: U.S. Government Printing Office.

FAA, AC43-3: Non-destructive Testing in Aircraft. Washington, D.C.: U.S. Government Printing Office.

FAA, AC43-7: Ultrasonic Testing in Aircraft. Washington, D.C.: U.S. Government Printing Office.

FAA, AC43.13-1A: Acceptable Methods, Techniques and Practices-Aircraft Inspection and Repair. Washington, D.C.: U.S. Government Printing Office.

FAA, AC43.13-2A: Acceptable Methods, Techniques and Practices-Aircraft Alterations. Washington, D.C.: U.S. Government Printing Office, 1977.

FAA, AC65-9A: General Handbook. Washington, D.C.: U.S. Government Printing Office.

FAA, AC65-12A: Powerplant Handbook. Washington, D.C.: U.S. Government Printing Office, 1976.

FAA, AC65-15A: Airframe Handbook. Washington, D.C.: U.S. Government Printing Office, 1976.

McGraw-Hill, Aircraft Basic Science. New York: Gregg/McGraw-Hill, 1980.

McGraw-Hill, Aircraft Maintenance and Repair. New York: Gregg/McGraw-Hill, 1980.

McGraw-Hill, Aircraft Powerplants. New York: Gregg/McGraw-Hill, 1978.

McGraw-Hill, Electricity and Electronics for Aerospace Vehicles. New York: Gregg/McGraw-Hill, 1972.

Pratt & Whitney, The Aircraft Gas Turbine Engine and Its Operation. Middletown, CT: Pratt & Whitney Aircraft.

AUDIOVISUALS

Aviation Maintenance Publishers
Cessna Aircraft
Prestolite Corporation
Sanderson

STUDENT MANUALS

Aviation Maintenance Publishers, Aircraft Gas Turbine Powerplant Workbook. Basin, WY: Aviation Maintenance Publishers.

Oregon State Department of Education, Individualized Math Problems in Aviation Mechanics. Salem, OR: Oregon State Department of Education, 1974.

EVALUATION MATERIALS

Acme, A&P Mechanic Practical Test. Ft. Worth, TX: Acme School of Aeronautics, 1981.

Acme, Airframe Mechanic-New FAA Exams Made Easy. Ft. Worth, TX: Acme School of Aeronautics, 1981.

Acme, Airframe Mechanic-New FAA Exam Explanations. Ft. Worth, TX: Acme School of Aeronautics, 1981.

Acme, General Mechanic-New FAA Exams Made Easy. Ft. Worth, TX: Acme School of Aeronautics, 1981.

Acme, General Mechanic-New FAA Exam Explanations. Ft. Worth, TX: Acme School of Aeronautics, 1981.

Acme, Powerplant Mechanic-New FAA Exams Made Easy. Ft. Worth, TX: Acme School of Aeronautics, 1981.

Acme, Powerplant Mechanic-New FAA Exam Explanations. Ft. Worth, TX: Acme School of Aeronautics, 1981.

Allen, D., A National Study of the Aviation Mechanics Occupation-Phase III. Los Angeles: University of California, 1971. (Available from National Technical Information Service).

FAA, AC65-20: General Written Test Guide. Washington, D.C.: U.S. Government Printing Office, 1978.

FAA, AC65-21: Airframe Written Test Guide. Washington, D.C.: U.S. Government Printing Office, 1978.

FAA, AC65-22: Powerplant Written Test Guide. Washington, D.C.: U.S. Government Printing Office, 1978.

ADDITIONAL INSTRUCTIONAL MATERIALS

The additional instructional materials provide supplimentary resources that are not referenced in the Unit Guides section.

The following audiovisuals and textbooks are produced by industry, media companies and various military branches. This information can be updated by consulting Books in Print and Index to Vocational and Technical Education.

Addresses for these producers may be found in the "Resource Addresses" which concludes this section.

AUDIOVISUALS

ABC Media Concepts, Inc.
"Wire" (MF)

Acoustifone Corporation
"Aircraft Electrician" (FS)
"Engine Mechanic" (FS)
"Instrument Repairman" (FS)
"Radio Repairman" (FS)

Beech Aircraft Corp.
"Aircraft Wood Repair, Part 2 - Stiffener Patch" (MF)
"Aircraft Wood Repair, Part 3 - Leading Edge Repair" (MF)
"Aircraft Wood Repair, Part 4 - Bulkhead Repair" (MF)

BFA Educational Media
"Airplanes - A First Film" (MF)
"Building a Test Plane "FL)

Bray Studios, Inc.
"Using the Air Space-Flight Line Servicing" (MF)

Carmen Educational Association
"How Birds Fly" (FS)

Coronet Instructional Films
"Aircraft Engines-Piston and Jet" (FS)

Curriculum Materials Corp.
"Airplanes" (FS)

Douglas Aircraft Company
"Miniature Electrical Connector, Deutsch Soldering and Assembly Techniques" (MF)

Encyclopedia Britannica Education Corporation
"Airplane Mechanics" (FL)

Eastman Kodak Co.
"I Fly Them, I Break Them, I Fix Them (Model Airplanes)" (MF)

Electronic Futures, Inc.
"Aircraft Propulsion Systems" (AT)
"Control and Guidance of Fixed Wing Aircraft" (AT)

Electronic Futures, Inc. (Con't)
"Fixed Wing Aircraft" (AT)
"Rotary Winged Aircraft" (AT)

Eye Gate House, Inc.
"Aircraft Maintenance Mechanic" (FS)
"Jet Engine Mechanics" Trainee" (FL)

Federal Aviation Administration
"How Airplanes Fly" (MF)

Films, Inc.
"Who Invented the Airplane and How Does It Fly" (MF)

General Motors Corp.
"ABC of Jet Propulsion" (MF)

Irv Levine Associates
"How the Jet Engine Works" (FS)

Jeppesen Sanderson
"Airplane Performance, Part 1" (FS)
"Airplane Systems and Instruments-Flight Control Systems and Instruments" (FS)
"Airplane Systems and Instruments-Reciprocating Engine and Related Systems" (FS)
"Careers in Aviation-Aerospace" (FS)
"Science of Flight-the Airplane and It's Components" (FS)
"Weight and Balance, Part 1" (FS)
"Weight and Balance, Part 2" (FS)

McGraw-Hill Films
"Airplanes and How They Fly (2nd Ed.)" (MF)

Minnesota Mining and Manufacturing Co.
"Airplane Production (TR)
"All Axes Pass Through the Center of Gravity" (TR)
"The Basic Parts of an Airplane" (TR)
"Basic Wing Types" (TR)
"How the Alirons Are Controlled, No. 1" (TR)
"How the Alirons Are Controlled, No. 2" (TR)
"Jet Propulsion and Ram Jet Engine" (TR)
"Small and Large Planes Fuselage Constructions" (TR)
"Turbo Jet Engine and Afterburner" (TR)

National Instructional Films
"Aircraft Ramp Service" (FL)

National Tape Repository
"Electromagnetism" (AT)
"Newton's Revolution" (AT)
"Probing the Atom" (AT)
"The Spectroscope" (VT)
"What is Relativity?" (VT)

Norwood Films
"Aircraft Tires and Tubes-Maintenance, Inspection and Inflation Procedures" (MF)
"Helicopter Maintenance, Part 3-Introduction to Power Trains" (MF)
"Helicopter Orientation-the Basic Anatomy of the Helicopters" (MF)
"Helicopter Vibrations and Resonance, Part 1-Vibrations in the H-13" (MF)
"Helicopter Vibrations and Resonance, Part 2-Vibrations in the H-19" (MF)
"Helicopter Vibrations and Resonance, Part 3-Vibrations in the H-21" (MF)

Norwood Films (Con't)
"Helicopter Vibrations and Resonance, Part 4-Ground Resonance" (MF)
"Ignition and Spark Plug" (MF)
"Maintaining the HLT Training Type Helicopter-Rotor Systems and Related Controls" (MF)
"Maintaining the Hub Service Type Helicopter-Rotor Systems and Related Controls" (MF)
"Maintenance Management-Collection and Use of Maintenance Data" (MF)

Phoenix Films, Inc.
"Wings and Things" (MF)

Pratt and Whitney Aircraft
"Engine Disassembly (Horizontal & Vertical) and Hot Section Inspection" (SS)
"Power Assurance Checks and Trend Monitoring" (ST)
"Power and the Quest" (MF)

Prentice-Hall Media
"Aircraft-Their Power and Control-A Series" (FS)
"How Helicopters Fly" (FS)
"Jet Power" (FS)

Sanderson Films
"Aircraft Piston Engine, Part 1-Ignition and Spark Plugs" (FS)
"Aircraft Piston Engine, Part 2-Used Spark Plugs Tell a Story" (FS)

Time-Life Films, Inc.
"Jet Propelled-The Incredible Story of the Jet Engine" (MF)

Society For Visual Education, Inc.
"Kinds of Airplanes" (ST)
"Parts of an Airplane" (ST)

Tweedy Transparencies
"Parts of an Aircraft" (TR)

United Aircraft, Corporation
"Fuel Cell" (MT)
"Value Engineering at Pratt and Whitney Aircraft" (MF)

U.S. National A/V Center
"Adjustments After Checking Flight" (MF)
"Aerodynamics-Air Flow" (MF)
"Aerodynamics-Forces Action on an Air Foil" (MF)
"The Aeroproducts Propeller,-Line Inspection and Maintenance" (MF)
"The Aeroproducts Propeller-Removal, Reinstallation, Ground Run-up and Flight Test" (MF)
"The Aeroproducts Propeller,-Theory and Flight" (MF)
"Air Force Fuel and Facilities-Aviation Fuel Dispensing Facilities" (MF)
"Air Force Fuel and Facilities-Aviation Fuel Receipt and Storage" (MF)
"Air Force Fuel and Facilities-Aviation Fuel Supply and Transportation" (MF)
"Air Start Check Valve, Cylinder Relief Valve and Indicator Cock" (MF)
"Aircraft Engines-Elements of Electricity as Applied to Ignition Systems" (MF)
"Aircraft Engine R3350-30W-Principles of Operation" (MF)
"Aircraft Fifty Hour Inspection" (MF)
"Aircfart Nomenclature, Part 2, Wing Parts and Control Surfaces" (FS)

U.S. National A/V Center (Con't)

"Aircraft Nomenclature, Part 3, Floats and Hulls" (FS)
"Aircraft Tires and Tubes-Shop Inspection Storage and Disposition" (MF)
"Airplane" (MF)
"Airplane Hydraulic Brakes-Types Construction and Action" (MF)
"Airplane Structures-Control Surfaces" (MF)
"Army Aircraft Gas Turbine Engine Operation, Part 2-Controls and Instrumentation" (MF)
"Army Aircraft Gas Turbine Engine Operation, Part 3-Construction and Operation of the T-53" (MF)
"Assembling in a Jig-Fitting and Lining Up" (MF)
"Attaching and Aligning Wings" (MF)
"Aviation Mechanic" (MF)
"Blanking and Punching" (MF)
"Building a Box Beam Spar" (MF)
"Building a Wooden Rib" (MF)
"But How Does It Fly" (MF)
"Care and Repair of Flight Controls" (FS)
"Cleaning the Airplane" (FS)
"Connecting and Adjusting Controls" (MF)
"DC Motor, Part 2-Rewinding" (MF)
"Disassembling the Engine" (MF)
"Drilling with Portable Drill Motors" (MF)
"Engine" (MF)
"Engine Change-Installation" (MF)
"Engine Change-Removal" (MF)
"Fabricating Metal Aircraft" (MF)
"Fitting Tube, Shaft and Propeller" (MF)
"Forces Acting on an Airfoil" (MF)
"Foreign Objects Damage to Army Aircraft" (MF)
"Forming on a Hand Operated Brake" (MF)
"Forming with Rubber on the Hydraulic Press" (MF)
"Fuel Inductions" (MF)
"Ground Crew Safety" (MF)
"Ground Handling of Aircraft in Cold Weather" (MF)
"Ground Safety on the Flight Line, Part 1" (MF)
"Ground Safety on the Flight Line, Part 2" (MF)
"Hazards in Ground Operation of Jet Aircraft" (MF)
"Helicopter Fire Control" (MF)
"In These Hands" (MF)
"Inspecting and Reconditioning Piston Assembly" (MF)
"Inspecting and Reconditioning Valve Assembly" (MF)
"Inspection of Alighting Gear" (MF)
"Inspection of Minor Assemblies" (MF)
"Inspection of Plumbing and Piping" (MF)
"Installing and Aligning Tail Surfaces" (MF)
"Installing Landing Gear" (MF)
"Introduction to Aircraft Engine Instruments" (MF)
"Introduction to Aircraft Flight Instruments" (MF)
"Introduction to Basic Aircraft Engines" (MF)
"Maintenance" (MF)
"Maintenance Safety in Aviation-Murphy's Law" (MF)
"Making a Master Developed Layout, Part 1" (MF)

U.S. National A/V Center (Con't)
"Making a Master Developed Layout, Part 2-and Making the Form Block" (MF)
"Making a Wrapped and Soldered Splice" (MF)
"Men of Maintenance-Southeast Asia" (MF)
"Nondestructive Inspection-A Dollar Saving Diagnostic Tool" (MF)
"Overhauling Camshaft Assembly and Crankcase Section" (MF)
"Overhauling Crankshaft Assembly" (MF)
"Overhauling the Carburetor" (MF)
"Patching Fabric" (MF)
"Patching Plywood" (MF)
"A (H-CA) Plane Is Born" (MF)
"Principles and Types of Propellers" (MF)
"Reassembling the Engine" (MF)
"Removing and Inspecting Cylinders" (MF)
"Removing and Inspecting Assemblies" (MF)
"Repairing a Wooden Rib" (MF)
"Repairing Aircraft Tires" (MF)
"Repairing Structural Tubing" (MF)
"The Service Module" (MF)
"Servicing a Propeller" (MF)
"Servicing an Airplane" (MF)
"Servicing Spark Plugs and Ignition Wiring" (MF)
"Splicing a Wooden Spar" (MF)
"Spot Welding" (MF)
"Swaging Cable Terminals" (MF)
"Trouble Shooting Problems-Mechanical and Lubrication" (MF)
"Tube Bending by Hand" (MF)
"Turboprop/Turboshaft Engines-Introduction" (MF)
"Wing Assembly-The Inboard Panel" (MF)
"Wing Assembly-The Nose Section" (MF)

United Transparencies, Inc.
"Aircraft Control Services" (TR)
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D'Estout, H.G., Aircraft Weight and Balance Control. Fallbrook, CA: Aero Publishers, Inc., 1967.

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Pratt & Whitney, JT3D Turbofan Engine Training Handbook. East Hartford, CT: Pratt & Whitney Aircraft, 1977.

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Treager, I.E., Aircraft Gas Turbine Engine Technology. New York: Gregg/McGraw-Hill, 1979.

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Zweng, C.A., Powerplant Mechanic. Van Nuys, CA: Pan American Navigation, 1980.

FEDERAL AVIATION ADMINISTRATION PUBLICATIONS

The Federal Aviation Administration produces many publications for aviation maintenance students and educators. To maintain an up-to-date listing of these and other publications, the instructor should request "Guide to Federal Aviation Administration Publications" #APA-PG-4 and "Advisory Circular Checklist" #AC00-2TT. These publications may be obtained free of charge by writing: Public Inquiry Center, APA-430 Federal Aviation Administration, Washington, D.C. 20591. Note: Publications preceeded by an asterisk denotes items which are for sale. Those not identified by an asterisk are free of charge.

Federal Aviation Regulations (FAR's)

*Part 1. Definitions and Abbreviations

*Part 21. Certification Procedures for Products and Parts

*Part 23. Airworthiness Standards: Normal Utility, and Acrobatic Category Airplanes

*Part 25. Airworthiness Standards: Transport Category Airplanes

*Part 27. Airworthiness Standards: Normal Category Rotorcraft

*Part 29. Airworthiness Standards: Transport Category Rotorcraft

*Part 33. Airworthiness Standards: Aircraft Engines

*Part 35. Airworthiness Standards: Propellers

*Part 36. Noise Standards: Aircraft Type and Airworthiness Certification

*Part 43. Maintenance, Preventive Maintenance, Rebuilding, and Alterations

*Part 45. Identification and Registration Marking

*Part 47. Aircraft Registration

*Part 65. Certification: Airmen Other Than Flight Crewmembers

*Part 145. Repair Stations

*Part 147. Aviation Maintenance Technician Schools

Airworthiness Directives (AD's)

*Summary of Airworthiness Directives for Small Aircraft. Volume I

*Summary of Airworthiness Directives for Large Aircraft. Volume II

Flight Standards Forms

AC Form 8050-1	Aircraft registration application
AC Form 8050-2	Aircraft bill of sale
FAA Form 8110-12	Application for type certificate, production-certificate, or supplemental type certificate
FAA Form 8600-12	FAA Inspection reminder
FAA Form 8010-4	Malfunction or defect report
FAA Form 8740-5	Safety improvement report
FAA Form 8130-6	Application for airworthiness certificate
FAA Form 337	Major repair and alterations
FAA Form 8610-1	Mechanic's application for inspection authorization
FAA Form 8610-2	Airman certificate and/or rating application

Advisory Circulars

*Acceptable Methods, Techniques and Practices-Aircraft Alterations, 43.13-2A (6-9-77).

*Acceptable Methods, Techniques and Practices-Aircraft Inspection and Repair, 43.13-1A (4-17-72).

FAR 135: Additional Maintenance Requirements for Aircraft Type Certified for Nine or Less Passenger Seats, 135-7 (10-24-78).

Aids Authorized for Use by Airman Written Test Applicants, 60-11A (12-14-79).

Airborne Automatic Direction Finder Installations (Low and Medium Frequency), 20-63 (7-7-69).

Airborne Homing and Alerting Equipment for use with Emergency Locator Transmitters, 20-87 (5-7-73).

Airborne VHF Communication System Installations, 20-67A (10-17-72).

Aircraft Airworthiness: Restricted Category: Certification of Aircraft With Uncertificated or Altered Engines or Propellers, 21-8 (5-21-69).

Aircraft Data, 150/5325-B (7-30-75).

Aircraft Engine Crankshaft Failure, 20-103 (3-7-78).

Aircraft Engine Type Certification Handbook, 33-2A (6-5-72).

Aircraft Fire and Rescue Facilities and Extinguishing Agents, 150/5210-6B (1-26-73).

Aircraft Fuel Control, 20-43C (10-20-76).

Aircraft Ground Handling and Servicing, 00-34A (7-29-74).

Aircraft Ice Protection, 20-73 (4-21-71).

Aircraft Inspection for the General Aviation Aircraft Owner, 20-106 (April 1978).

Aircraft Metal Propeller Blade Failure, 20-37C (7-15-80).

Aircraft Position and Anticollision Light Measurements, 20-74 (7-29-71).

Aircraft Weight and Balance Control, 120-27A (5-14-80).

*Airframe and Powerplant Mechanics Airframe Handbook, 65-15A (4-12-76).

*Airframe & Powerplant Mechanics Airframe Written Test Guide, 65-21 (1978).

*Airframe and Powerplant Mechanics Certification Guide, 65-2D (1-30-76).

Airframe and Powerplant Mechanics Certification Information, 65-11 (4-21-71).

*Airframe and Powerplant Mechanics-General Handbook, 65-9A (4-12-76).

*Airframe & Powerplant General Written Test Guide, 65-20 (1978).

*Airframe and Powerplant Mechanics Powerplant Handbook, 65-12A (4-12-76).

*Airframe & Powerplant Mechanics Powerplant Written Test Guide, 65-22 (1978).

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Airplane Deice and Anti-Ice Systems, 91-51 (9-15-77).

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Airworthiness Directives for General Aviation Aircraft, 39-7 (7-10-79).

Alternate Static Source for Altimeters and Airspeed and Vertical Speed Indicators, 135-155-1 (2-16-65).

Altitude Alerting Devices/Systems, 91-22A (12-23-71).

Altimeter Setting Sources, 91-14D (4-9-79).

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Announcement of Availability-Aircraft, Aircraft Engines and Propeller Type Certificate Data Sheets and Specifications, 21-15A (8-31-79).

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Announcement of Availability-Summary of Airworthiness Directives, 39-6G (3-24-80).

Announcement of Availability-Summary of Supplemental Type Certificates 1980 Edition, 21-5F (6-23-80).

Annual Aviation Mechanic Safety Awards Program, 60-2N (3-3-78).

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Automatic Landing Systems (ALS), 20-57A (1-12-71).

Automatic Pilot Systems Approval, 25.1329-A (7-8-68).

Automatic Pressure Altitude Encoding Systems and Transponders Maintenance and Inspection Practices, 43-6A (11-11-77).

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*Aviation Instructor's Handbook, 60-14 (7-7-76).

Background Information on the Aircraft Performance Curves for Large Airplanes, 150/5325-3 (1-26-65).

*Basic Helicopter Handbook, 61-13B (Revised 1978).

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Cockpit Voice Recorder Installations, 25.1457-1A (11-3-69).

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Damage-Tolerance and Fatigue Evaluation of Structure, 25.571-1 (9-28-78).

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Eligibility, Quality, and Identification of Approved Aeronautical Replacement Parts, 20-62C (8-26-76).

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Maintenance Inspection Notes for Douglas DC-6/7 Series Aircraft, 20-52 (8-24-67).

Maintenance Inspection Notes for Fairchild Hiller F-27/FH-227 Series Aircraft, 20-82 (12-5-72).

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Specification for L-841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport Lighting Circuits, 150/5345-13 (1-6-64).

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Status and Availability of Military Handbooks and ANC Bulletins for Aircraft, 20-3C (6-1-73).

Status of Federal Aviation Regulations, 00-44P (3-1-81).

Test Procedures for Maximum Allowable Airspeed Indicators, 32A (10-22-74).

Tie-Down Sense, 20-35B (4-19-71).

Turbine-Engine Foreign Object Ingestion and Rotor Blade Containment Type Certification Procedures, 33-1B (4-22-70).

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Use of Aircraft Fuel Anti-icing Additives, 20-29B (1-18-72).

Use of Alternate Grades of Aviation Gasoline for Grade 80/87, 91-33 (10-6-71).

Use of Manufacturers' Maintenance Manuals, 20-77 (3-22-72).

Vibration Evaluation of Aircraft Propellers, 20-66 (1-29-70).

Educational and Career Materials

GA 20-29	Main Parts of An Airplane
GA 20-30	Demonstration Aids for Aviation Education
GA-20-30A	Volume II Demonstration Aids
GA 20-62	How We Made the First Flight
GA 300-114	The Flying Machine in Room 201
GA 300-124	Aviation Careers: Airport Careers
GA 300-125	Aviation Careers: Aircraft Manufacturing Occupations
GA 300-127	Aviation Careers: Flight Attendants
GA 300-128	Aviation Careers: Government Careers
GA 300-129	Aviation Careers: Agricultural Aviation
GA 300-130	Directory of Aviation Majors and Curricula Offered by Colleges and Universities
GA 300-141	Delta Dart Teacher's Guide
GA-300-143A	August Martin Activities Book
GA-300-143B	A Model Aerospace Curriculum

RESOURCE ADDRESSES

ABC Media Concepts, Inc.
1330 Ave. of The Americas
New York, NY 10019

Acme School of Aeronautics
Terminal Building, Meachem Field
Fort Worth, TX 76106

Acoustifone Corporation
7428 Bellaire Ave.
North Hollywood, CA 91605

Aero Publishers, Inc.
329 W. Aviation Road
Fallbrook, CA 92028

Aviation Maintenance Publishers
P.O. Box 890
Basin, WY 82410

Beech Aircraft Corp.
Film Library
Wichita, KS 67201

BFA Educational Media
2211 Michigan Ave.
P.O. Box 1795
Santa Monica, CA 90406

Bray Studios, Inc.
630 Ninth Ave.
New York, NY 10036

Carmen Educational Association, Inc.
Box 205
Youngstown, NY 14174

Cessna Aircraft Corp.
Air Age Education Dept.
P.O. Box 1521
Wichita, KS 67201

Coronet Instructional Films
65 E. South Water Street
Chicago, IL 60601

Curriculum Materials Corp.
1319 Vine Street
Philadelphia, PA 19107

Delmar Publishers, Inc.
50 Wolf Road
Albany, NY 12205

Douglas Aircraft Company
Film and TV Communications
3000 Ocean Park Blvd.
Santa Monica, CA 90406

Eastman Kodak Co.
Informational Films Divisions
343 State Street
Rochester, NY 14650

Electronic Futures, Inc.
57 Dodge Ave.
North Haven, CT 06473

Encyclopedia Britannica Educational Corporation
425 N. Michigan Ave.
Chicago, IL 60611

Eye Gate House, Inc.
146-01 Archer Ave.
Jamaica, NY 11435

Federal Aviation Administration
AC-921 Film Library
P.O. Box 25802
Oklahoma City, OK 73125

Federal Aviation Administration
Public Inquiry Center
APA 430
Washington, DC 20591

Films, Inc.
1144 Wilmette
Wilmette, IL 60019

General Motors Corp.
3044 West Grand Blvd.
Detroit, MI 48238

Georgia Office of Vocational Education
Georgia Department of Education
Atlanta, GA 30334

Gregg/McGraw-Hill
1221 Ave. of The Americas
New York, NY 10020

Irv Levine Associates
49 West 45th Street
New York, NY 10036

Jeppesen Sanderson
8065 E. 40th Avenue
Denver, CO 80277

John Wiley and Sons
605 Third Avenue
New York, NY 10158

McGraw-Hill Films
1221 Ave. of The Americas
New York, NY 10020

Minnesota Mining and Manufacturing Co.
Medical Film Library
3M Center
St. Paul, MN 55101

National Instructional Films
49 South Main Street
Spring Valley, NY 10977

National Tape Repository
University of Colorado
Boulder, CO 80302

National Technical Information Service
U.S. Department of Commerce
5258 Port Royal Road
Springfield, VA 22161

Norwood Films
P.O. Box 1894 Wheaton Post Office
Silver Springs, MD 20902

Oregon State Department of Education
700 Pringle Parkway, SE
Salem, OR 97310

Pan American Navigation
16934 Saticoy
Van Nuys, CA 91406

Phoenix Films, Inc.
470 Park Avenue South
New York, NY 10016

Pratt and Whitney Aircraft
400 Main
East Hartford, CT 06108

Prentice-Hall Media
150 White Plains Road
Tarrytown, NY 10591

Prestolite Electrical Division
511 Hamilton Street
Toledo, OH 43694

Sanderson Films
P.O. Box 13121
Wichita, KS 67213

Society for Visual Education, Inc.
Division of The Singer Company
1345 Diversey Parkway
Chicago, IL 60614

Time-Life Films, Inc.
20 Biekman Place
New York, NY 10022

Tweedy Transparencies
208 Hollywood Blvd.
East Orange, NY 07018

United Aircraft Corporation
400 Main
East Hartford, CT 06108

U.S. Government Printing Office
Superintendent of Documents
Washington, DC 20402

U.S. National Audiovisual Center
National Archives and Records Service
General Services Administration
Order Section/RK
Washington, DC 20409

United Transparencies, Inc.
P.O. Box 688
Binghampton, NY 13902

University of North Carolina
Audiovisual Bureau
111 Abernathy Hall
Chapel Hill, NC 27514

Visual Publications
716 Center Street
Lewiston, NY 14092

Vocational Education Materials
Center
Division of Vocational Education
College of Education
University of Georgia
Green Street
Athens, GA 30602

Vocational Curriculum Center
Georgia Department of Education
3952 Shirley Drive
Atlanta, GA 30336

APPENDIX B

Special Needs

WORKING WITH SPECIAL NEEDS STUDENTS*

Introduction

Special needs population students are those who are designated as handicapped or disadvantaged. The 1976 vocational education amendments define handicapped individuals as:

> Persons who are mentally retarded, hard of hearing, deaf, speech impaired, visually handicapped, seriously emotionally disturbed, orthopedically impaired, health impaired, or persons with other specific disabilities, who by reason thereof require special education and related services and who cannot succeed in the regular vocational education programs.

In those same amendments disadvantaged persons are defined as:

> Persons (other than handicapped persons) who have academic or economic disadvantages and who require special services, assistance or programs in order to enable them to succeed in vocational education programs.

Federal legislation requires that these special needs population students be given an opportunity to function in regular vocational education programs (Essentially, this is what is meant by the term mainstreaming.). This section provides information on how such students are identified and how they can be mainstreamed into regular vocational education environments.

Figure One presents a conceptual model depicting various activities of the process in identifying and mainstreaming special needs students in vocational education. These activities

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*The project director wishes to thank Mrs. Ann Lary, State Department of Education staff and Mrs. Rhonda Packer, VEMC staff, for their careful review of this section and for their suggestions that improved the overall value of this paper. Appreciation is also extended to Ray Butler for his patient work in reviewing and sorting available resources.

are conducted at three levels: the community level, the school level (Career Development Center) and the classroom level. All three levels must work together if implementation of the process is to be effective.

Identification of the Special Needs Student

Through a variety of pre-testing procedures, special needs students are identified and their potentials are evaluated at the community level. This evaluation process consists of collecting and assessing the following data for each student:

-Medical History
-Educational Records
-Vocational Development
-Communication Skills
-Dexterity/Motor Skills
-Adaptive Behavior
-Teacher Observations

When this procedure has been completed, the community personnel refers the student to the appropriate school level personnel. As a part of the referral and school intake process, an Individualized Educational Plan should be initiated.

> The Individualized Educational Plan (IEP) is exactly what its name implies--a plan for the education of a specific individual. The base content of the IEP is outlined in Public Law 94-142. According to that outline, the IEP must include at least the following information: (a) student's present level of functioning, (b) his/her long range instructional objectives, (c) his/her short-range instructional objectives and finally, (d) some criteria to determine that those objectives have been achieved.

Development of the Individual Education Plan

It would be very difficult to anticipate the exact kind or type of special needs students one might find in an Aviation Mechanics program at any one time. The terms disadvantaged and handicapped are really "catch-all" terms that indicate a wide assortment of problems that might occur in a student represent-

ing one of these populations. In addition to the lack of a specific definition and the fact that the typical vocational instructor has had very little preparation in working with these students, it becomes clear that you will need a basic plan to use in meeting their occupational preparation needs. The following steps can serve as your basic planning procedure for mainstreaming a special needs population student into your curriculum.

The first step occurs after you have been notified that a special needs student can profit from being in your vocational program. When you have received that notification, you should contact your coordinator of student personnel services and ask for a detailed report of the student's assessed status. Note the word assessed; it is critical. Through a formal assessment status, appropriate school personnel and community should have identified the student's strengths and weaknesses as well as the specific handicapping conditions. After you have received the assessment information and understand it you are ready for Step Two.

Step Two, developing (or completing) the vocational aspects of the Individual Education Plan-IEP, is usually performed for handicapped students only; however, it has just as much merit for the disadvantaged. The IEP is a very useful tool. It should be considered the description of what you expect that student to be able to do when he or she completes your course and how you will provide the learning experiences to assure that those expected outcomes will be achieved. Be sure that you keep this IEP in a convenient place and use it.

The IEP is usually developed through group activities called staffings. Staffings may be held as often as needed and can be used to modify the IEP as the student moves through the program. When a student is about to be mainstreamed into your curriculum, you must become involved in the staffing sessions that will develop the vocational aspects of the IEP. IT IS YOUR RIGHT AND YOUR DUTY, therefore, your being present during the staffings is imperative. The special education personnel can present the student's interests, strengths and limitations. However, only you, the vocational instructor, can relate these to your program. This means that the final statement of the job (DOT) and the task level (short term) objectives are primarily defined by you the vocational instructor.

In Step Three the IEP will first be used to suggest how the curriculum and/or the facilities can be modified to accommodate the special needs population student. Modifying the curriculum means that in most cases special adjustments will have to be made in the student materials and that special instructional strategies will need to be developed. When you say modify the curriculum you are not suggesting that the content be "watered down" - you are proposing alternate ways to teach the proper/required content. REMEMBER! ALL VOCATIONAL EDUCATION PROGRAMS ARE BASED ON REAL JOBS THAT HAVE THEIR OWN TASKS AND STANDARDS. AS FAR AS YOU ARE CONCERNED, YOU HAVE NO POWER TO CHANGE THESE. YOU ALSO CANNOT SUCCESSFULLY CREATE A WHOLE NEW JOB.

Modification of facilities and equipment is a concern when working with the phyically handicapped. Be reminded that by

law your school building must already meet requirements of accessibility to all handicapped persons--especially those who are blind or are confined to wheelchairs. Your chief concern is to be sure that your classroom and laboratory will allow the handicapped students to be comfortable and above all to learn. You will also need to make certain modifications that will enable handicapped students to properly and safely use the "tools and equipment of the trade". It is foolish to think that you would have a ready answer for all or any particular one of these physical handicaps--call on the experts. Vocational rehabilitation counselors and other staff have been concentrating on these problems for many years. They should be able to offer a number of positive suggestions. A combination of VR experience and instructor creativity can and has produced outstanding results.

As we think about curriculum modification it would help to review some general learning needs of this population.

> The educationally mentally retarded will constitute a major population now entering vocational education. The key concept to remember in modifying the curriculum for this population is that they require much more detail in order to learn and they require a great deal more practice time. All curriculum modifications for these groups should be made by detailing each task or objective into its smallest parts and by providing for more and more practice.
>
> The hearing and visually impaired can be accommodated by common sense and the use of supporting resource personnel. Neither of these groups reads well or learns from reading as a primary mode. This should be accounted for in modifying the curriculum, i.e., larger print, brail and recordings for the blind and captions on visual materials, seating arrangements, use of notes from a classmate, lower reading level textbooks, oral testing and total communications for the deaf.

The orthopedically handicapped usually require attention to facilities and equipment. Beyond that, their learning needs are as varied as those of the normal population. Remember, some of these individuals will actually be highly gifted in their chosen field. Their major needs will be psychological and coping with the school environment.

The disadvantaged are physically and mentally capable of learning, but their background has not allowed them to fully develop the discipline and cognitive skills (i.e., vocabulary, math, etc.) required to master occupational preparation courses. They have also developed an anti-school attitude that complicate many efforts to modify the curriculum for them. Usually their success in the vocational program is contingent on either a good pre-vocational program or a supporting academic program.

Step Four requires that instructional strategies be selected. These strategies may be many and should be varied. They should reflect the best learning technique for a given student and his or her chosen occupation. Some examples of instructional strategies are discussed below.

Teacher demonstration: Simply show the student how the job is to be done in clear distinct steps.

Peer demonstration: This technique allows the instructor to use one of the advanced students to demonstrate a particular task in a step by step fashion. It is a flexible system. For example, you can use peer demonstration to show each task step while you explain them to the students. When working with the mentally retarded, you will never have enough time to demonstrate a task as often as they may need to see it. In such situations, the well prepared advanced student can perform and explain the same demonstration several times.

Shadowing: Shadowing can be used in conjunction with demonstrations. By shadowing, the student is allowed to do exactly what the demonstrator does. This allows the student to learn in a see and do fashion. The student may shadow the instructor, an advanced peer or in some instances the worker on the job.

Job site visits: Job site visits offer the student an opportunity to see the work being done in its natural location. Students can develop a worker identify a realistic view of how the tools, equipment and materials are brought together to produce the product.

Work group or team: By being a part of a work team, the student can learn the various roles in an occupation as having the opportunity to practice specific sets of skills under the tutelage of peers.

Individualized instruction: Appropriately prepared or adjusted individualized instruction is a big help in managing a class that contains a mixture of special needs population students and "norm group" students. Individualized instruction, no matter what the source, will require much developmental input from the instructor. In most all cases, however, the results are worth the effort.

Media: Many of the special needs populations require mediated instruction (i.e., hearing and visually impaired), however, the use of appropriate media enhances learning for all students. Media can range from a line drawing in an instructional module, to a video tape, to posters and charts. It can be instructor made or commercial. All that matters is that it exactly links to the objective.

Project Method: The value in using projects with special needs population students is that they help them mentally and physically unify all the parts into a uniform whole. Because of the detail required for them to learn, they need learning activities that relate all of the parts to the whole. The development of a product through an assigned project is an ideal integrating experience.

Simulations: Simulations meet a variety of instructional needs. One of the more important with special needs population students is providing the opportunity to develop proper safety concepts before actually working with the "live" equipment that could be dangerous to a careless student.

Role playing: Role playing is a part of several other instructional strategies. On its own, it is a very good procedure for developing the attitudes and values required of a successful worker-i.e., a sense of responsibility, the ability to take orders and follow directions, interpersonal skills and so on. It is a way to concentrate on developing good work habits and positive attitudes.

Peer instruction: Like peer demonstrations, peer instruction is able to multiply the instructor's available time. This allows individual students with specific needs to have more assistance. Peer instruction has values beyond expanding time; it is an excellent approach to learning. In almost every situation, both the peer teacher and the peer student profit from the exchange. In operation peer instruction is simply a matter of preparing and allowing one of the advanced students to teach small groups certain segments of a course.

Team teaching: As we have already noted, some special needs populations require a combination of vocational and special education presented in harmony. A team approach is the only way to meet that need. For team teaching to be effective, clarification of student needs (as defined by the IEP) and careful planning will be required.

Peer apprenticeships: The peer apprenticeship is an ideal way to induct the new special needs population student into the curriculum. By serving as the apprentice to an advanced student, the special needs population student can become climatized to the laboratory/shop and can begin to learn the tools, equipment and materials of the program. The shadow technique can also be added to increase hands-on learning.

Assessment and feedback: Student learning can be improved by frequently assessing students' skills and feeding back their strengths and weaknesses. Through a process of positive feedback, the student can be moved gradually from where he or she is to the level of skill required.

These instructional strategies can be used independently or in various combinations. This brief list is meant only to provide you with some suggestions, there are no doubt many other techniques that could be used. The creative instructor will be constantly innovating to meet the needs of particular students.

Implementing the IEP

Step Five is a matter of putting the vocational aspects of the IEP into operation. The activation of the IEP initiates the student into the vocational education program and allows him or her to progress through the modified curriculum at his or her optium rate. There should be frequent assessment activities that indicate where the student is relative to the IEP objectives. If problems are detected, a staffing should be conducted to re-evaluate the IEP and continue the process in a fashion that is most beneficial to the student.

Step Six will take the student to his or her next logical step of either totally exiting the system or recycling into a continuing education mode. In most cases, the student will do some of both--getting a job and periodically accessing the continuing education component of the educational system to refine existing skills or to broaden his or her capacity.

The ultimate goal of all this effort is not employment-rather it is "successful employment". Successful employment implies that not only is the student placed in a job, but that the student is able to sustain himself or herself in a working environment over an extended period of time.

Evaluation

Evaluation of the student's program is a critical step. Through that process we not only help the current student, but we are able to gather information that will improve our potential to help students with similar difficulties in the future. A well rounded evaluation system should consist of the following activities:

- En-route evaluation (formative) to monitor the student's progress through the program.
- Summative evaluation upon completion of the program to determine job readiness.
- Follow-up after placement to determine if the student is successful on the job.
- Follow-through activities designed to identify any further training needed, which may be indicated by the follow-up procedure.

RESOURCES

In recent years, mainstreaming of special needs population students has been an area of great concern to vocational

educators. The overall result of that concern is an abundance of well developed resource materials and a variety of personnel with special skills in working with these groups. In the space allowed by this curriculum guide, it would be impossible to present an adequate set of methods and procedures for solving the problems of students with special needs, but if the vocational eduction administrator and instructor will judiciously use the human and material resources listed here, much of the in-depth information required for the special and unique cases that will occur can be compiled from these sources.

Support Personnel or Systems

As was noted earlier, you the vocational instructor, simply do not have sufficient skills to work with special needs population students alone. There are too many different student problems to ever allow an instructor to deal with them all on a "come as you are" basis. For that reason, you must make yourself aware of the variety of support systems and personnel that are available to you and to the students. A few of these are listed here. These specialists can lead you to others on an as needed basis.

County Health Department - Many of your special needs population students will need some medical and dental assistance. The county health facility is an excellent referral source for these problems.

Special Education - Through local boards of education there are a variety of special education personnel available locally, regionally and from the State Department of Education. The vocational education administrator can obtain assistance from these specialists through the local superintendent's office.

Project SERVE - Project SERVE is a statewide effort to acquire materials and to cultivate expertise in providing vocational education to disadvantaged. Project Serve can

be contacted by the area vocational-technical director or the vocational supervisor.

Vocational Rehabilitation - Vocational rehabilitation is a highly developed organization whose major focus is all dimensions (such as: diagnosing, training, job placement and counseling) of the handicapped population. Within that network is a vast pool of expertise. You can contact it through the area vocational rehabilitation counselor who calls on your school or through a designated school official such as the coordinator of student personnel services or Career Development Center personnel.

Office of Student Personnel Services - In the area vocational-technical school, this is the key group as far as students and student needs are concerned. They can provide a variety of services to you and to your students. Many of the contacts with community agencies have already been made by this group-that alone will save the instructor much time.

Career Development Center - Each area vocational-technical school has a Career Development Center designed to meet the very special needs of incoming disadvantaged and handicapped students. The CDC staff is available to assist the instructional staff with a wide range of services for the special needs student populations.

All of the resources and resource personnel listed here are a part of the team. The best results can be obtained by using as many of these people and their support systems as possible from the beginning. In some situations, you will miss a resource in the beginning or the student's needs change. When that occurs do not hesitate to call on the appropriate experts for additional help. As a matter of fact, the rule of thumb that has always been used in the "helping professions" is to go as far as you can, then refer. Do not hesitate to call for help. Most of these service groups are funded to support "your" student. If you do not use them, they fail in their mission and you fail in yours.

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3100209 Student

-CVET General Mechanics 3100219 Teacher's Guide
3100229 Student

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APPENDIX C

Definition of Terms

DEFINITION OF TERMS

1. A/Vs-Audiovisuals - May refer to any picture and/or sound media. (ie. slides, tapes, filmstrips, 16 mm films, etc.)

2. Checkpoint - A student-instructor interface point wherein the instructor may give the student a test, perform a demonstration, or simply provide the student with additional needed information or instructions. Also a checkpoint may be used for motivational purposes.

3. Competency - The ability (knowledge, skills and attitudes) to perform all of a group or cluster of related tasks required to complete a designated activity according to occupational standards. In the educational setting, the statement of a competency includes expected student outcomes in terms of knowledge, skills and attitudes required to complete a designated activity as defined by incumbent workers according to the standards of the work place.

4. Course - A grouping of tasks and competencies which have a common knowledge base or are within a given domain.

5. Criterion-Referenced Measure - An exercise based upon a performance objective, the accomplishment of which measures attainment of that objective.

6. Criterion-Referenced Test - A test designed to measure student competencies based on job or industrial standards.

7. Curriculum Guide - A document containing the objectives, content, organization and structure of an instructional program. It is designed for use by administrators, instructional supervisors and teachers.

8. D.O.T. - Abbreviation for Dictionary of Occupational Titles. Document provides nine digit codes identifying each occupation.

9. Duty - One of the distinct major activities involved in the work performed. A Composition of related tasks.

10. Exit Point - A pre-determined point within an instructional program in which a student may exit with the essential competencies for a specific job. Usually defined in terms of D.O.T. codes and/or O.E. codes.

11. "Hands-On" - Statement implying the student is physically involved in a learning activity.

12. Individualized Instruction (I.I.) - A system of instruction allowing a student to progress at his/her fastest rate.

13. Job - A specific area of specialization within an occupational field consisting of several closely related duties for which a person would expect to receive remuneration. Should be identified by DOT code.

14. Job Sheet - (Or Operations Sheet) - A project of a performance nature. Generally performed by the student in a lab or shop type environment or in a specialized work area.

15. Live Work - Generally refers to items brought into the course area for repair or adjustment. Examples of live work might be automobiles, radios and TV's, air-conditioners, etc. Another form of live work would be patrons visiting the cosmetology department to receive permanents or other services.

16. Master Copies - Original copies of slides, tapes or written materials set aside for the purpose of duplication.

17. Occupational Cluster - A group of occupations sharing a common core of competencies. Georgia's comprehensive high school vocational program is organized around this concept.

18. Occupational Inventory - A listing of tasks to be performed in a particular occupational area, grouped under duty classifications.

19. O.E. - Refers to the U.S. Office of Education. O.E. codes are a classification system (taxonomy) for occupational education programs.

20. Open Entry - Term meaning that a student may enter the program at any time and does not have to wait for quarter or semester breaks.

21. Open Exit - Term meaning that a student may leave a program any time he/she completes occupational objectives.

22. Performance Guide - A series of steps arranged in a sequence which when completed may result in the performance of a task. Also called teaching steps.

23. Performance Objective - A statement in precise, measurable terms of a particular behavior to be exhibited by a learner underspecified conditions. It possesses each of the elements or characteristics specified below:

    a. Condition - The testing situation confronting the learner is clearly specified. This includes equipment provided or withheld, environmental constraints such as temperature, space, etc.

b. Performance - The specific behavior expected of the learner is stated.

c. Standard - The degree of acceptable performance is specified.

24. Performance Test - A test entailing not only the ability to answer questions, but measuring the student ability to operate, manipulate or perform a given task.

25. Program - An organized sequence of courses leading to an occupational objective. A program may contain one or more student exit points as defined by D.O.T. codes.

26. Program Objective - The outcome of a prescribed program of instruction. Usually expressed in terms of the occupation or job for which training is designed. D.O.T. codes are frequently used to identify program objectives or student exit points.

27. Self-Paced - Refers to a student moving through the prescribed training program at the fastest pace at which he/she can meaningfully learn.

28. Sequencing - Putting any set or series of learning activities or tasks into proper order or sequence. Normally arranged from simple to complex within groupings or blocks.

29. Software - Written or printed materials, slides, filmstrips, tapes, etc.

30. Student Manual - A document designed for use by students in a specific instructional program. It contains unit sheets, references, operational procedures, job sheets, etc.

31. Task - The smallest division of work in which a measurable output occurs. A logical and necessary step in the performance of a duty.

32. Task List - A listing of tasks performed by incumbent workers within a domain of interest. An example is a listing of all tasks performed by an automotive mechanic or by a worker in ornamental horticulture.

33. Unit - One "module" training material that generally covers one learning task and programmed on one unit sheet. May cover more than one lesson.

34. Unit Guide - A curriculum guide sheet that lists a task and objective with the instructional activities,instructional materials, evaluation and approximate time required for a student to successfully complete the task.

35. V'TECS Catalog - A comprehensive collection of performance objectives, performance guides, criterion-referenced measures and related data. Organized by a job structure or career ladder within a domain of interest.

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Title II - Loydia Webber, Vocational Equity Coordinator
Title VI - Peyton Williams Jr., Associate Superintendent of State Schools and Special Services
Title IX - Evelyn Rowe and Myra Tolbert, Coordinators
Section 504 - Jane Lee, Coordinator of Special Education

Inquiries concerning the application of Title II, Title VI, Title IX or Section 504 to the policies and practices of the department may be addressed to the persons listed above at the Georgia Department of Education, State Office Building, Atlanta 30334; to the Regional Office for Civil Rights, Atlanta 30323; or to the Director, Office for Civil Rights, Education Department, Washington, D.C. 20201.